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THE PROPOSED AWACS/F-15 ENHANCEMENTS)
SALE TO SAUDI ARABIA

A Staff Report Prepared
For the Committee on Foreign Relations

by

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SECRET

EXECUTIVE SUMMARY

This report examines the principal foreign policy and national security issues raised by the proposed sale of AWACS and F-15 enhancement equipment to Saudi Arabia. It is based on a staff visit to Saudi Arabia and Israel between August 20-31, 1981, during which the staff delegation flew on an eight-hour AWACS mission operating out of Riyadh, and discussions conducted in Washington and Tinker AFB, Oklahoma.

I. Implications of the AWACS Decision for U.S./Saudi Relations

The Saudi government attaches great importance to the proposed AWACS/F-15 enhancement sales. The outcome of the controversy will have both temporary and longer-term implications for U.S./Saudi political and economic relations. Disapproval could adversely affect Administration plans for the defense of the Persian Gulf region.

A. Political

Some observers believe that the Saudis will be more supportive of the Middle East peace effort if Congress approves the sales. The Saudis, however, are more likely to continue to be wary of aligning themselves with the United States on issues which seem to place the United States and Israel on one side and other Arab nations on the other. Saudi Arabia can be expected to seek U.S. cooperation on many issues but to follow an independent course when it believes its relations with other Arab states make that necessary.

Observers in Saudi Arabia suggest that the adverse effects of a disapproval of the sales might not necessarily be abrupt. It is more likely, they say, that it would have a gradual impact on decisions and attitudes down the road. "We would not take revenge, but psychologically we would feel our friend has failed us," one Saudi Foreign Ministry official said.

U.S. observers believe that a disapproval of the sales would be seen as indicating a lack of U.S. support for the Saudi regime and could thereby undercut Saudi prestige and leadership in the region. The proposed sales also involve prestige and standing within the Saudi government itself. A decision to disapprove the sales could diminish the influence of those officials who have championed a basically moderate, pro-Western orientation for the Kingdom.

B. Economic

Most U.S. specialists think it unlikely that Saudi anger over a disapproval of the sales would be manifested immediately in its oil policy. Overriding factors in the oil market are more likely to guide the decisions of the Saudi Ministry of Petroleum. These factors include the current glut and softness in prices, the increasing production capabilities of non-OPEC countries, revenue requirements, and Saudi Arabia's growing need for oil-associated natural gas to power the Kingdom's burgeoning electric power and petrochemical industries.

It is more likely that the consequences of disapproval would be registered in the area of U.S./Saudi trade. American businessmen in Saudi Arabia fear that while existing contracts would probably not be broken, they will lose out to non-American bidders in future contract competitions.

C. Regional Defense

The U.S. strategy for protecting vital Western interests in the Near East/Southwest Asia region has changed dramatically in recent years. Decisions made on the proposed sales could have a significant impact on U.S. plans to increase security co-operation in this critical region. In the Administration's eyes, the Saudi AWACS/F-15 enhancement sale and the newly-defined strategic relationship with Israel are essential elements in its effort to achieve a "strategic consensus" among states in the region that the Soviet Union represents the principal threat to their security.

II. Saudi Air Defense Requirements

The Saudis feel themselves surrounded by states with ties to Moscow. Among the likely threats against which Saudi Arabia must guard, the most demanding involves an Iranian air attack on Saudi oil facilities and marine shipping terminals in its Eastern Province.

A. Role of the AWACS and F-15 in Defense of Saudi Oil Fields

Without an airborne radar surveillance capability, the Saudis must rely on ground-based radars to provide warning of an Iranian air attack. Due to the limited range of ground-based radar coverage against very low altitude targets, though, Saudi Arabia would have to anticipate that the first wave in an Iranian attack on its main oil facilities would not be intercepted by fighter aircraft in time, and might well make a first bombing pass without ground-based missile and gun defenses getting off a shot.

With AWACS, the Saudis would have a substantially higher prospect of defeating, or at least deflecting, such an attack. If the AWACS is in position before the attack comes, and all human links in the air defense intercept sequence perform in a timely and error-free manner, the attack would be intercepted over the Persian Gulf and land defenses would be ready to engage any fighters that got through.

Despite the benefits that the AWACS can provide in this regard, this system would be neither a panacea nor a complete solution to protecting Saudia Arabia's vulnerable and exposed oil assets. Saudi and U.S. military planners would need to close a number of gaps in the planned AWACS concept of operations. Furthermore, no matter what is done to protect against sophisticated air attack, there will remain the threats posed by attack by surface ships, infiltration, or sabotage.

B. Alternatives to AWACS

Purchase of the British Nimrod appears to be the most likely Saudi alternative should the Kingdom give up its efforts to obtain the AWACS. If one assumes that the Nimrod development program will succeed in meeting British and NATO requirements and that the British could support Saudi manpower, training, and logistics needs, then the Nimrod would be fully capable of performing the air defense mission envisioned for the AWACS. Its time-on-station, radar detection, and communications capabilities are comparable to AWACS and well suited for providing early warning of low-level air attack across the Persian Gulf.

In certain key respects, though, an acquisition of the Nimrod by Saudi Arabia might be regarded by Israel as more threatening than would be the case with the AWACS. The Nimrod's frequency agile radar would be significantly more difficult to jam than is the case with AWACS. The Nimrod carries very sophisticated passive electronic detection equipment that enables it to detect and track aircraft, armored vehicles, and ships by means other than radar. And perhaps most significantly, Israel could not rely upon the British to attach any conditions to a Nimrod sale or to be as inclined to "pull the plug" on the system should Saudi Arabia employ the Nimrod against Israel in peace or war. On the other hand, Israel might well feel far less inhibited in attacking the Nimrod, in the air or on the ground, than would be the case with the U.S.-supported AWACS.

III. Military Implications of the Proposed Sales for Israel

An air force armed with AWACS does gain a limited capability for enhancing offensive action. But in the case of Saudi Arabia, there are significant costs and problems involved in any scenario in which the AWACS is used against Israel. As a result, a Saudi AWACS would not significantly alter the current Arab-Israeli air balance.

Maximum efficiency would probably be gained from an attack in which Saudi fighters alone were guided by AWACS as part of a coordinated Pan-Arab attack. The effectiveness of such an attack would be limited, however, by AWACS equipment limitations, Israeli radar and communications jamming and E-2C capabililities, terrain masking, AWACS vulnerability, and possible early warning from U.S. maintenance personnel. The costs for Saudi Arabia could be severe in terms of Israeli military retaliation and severed military ties with the United States.

An effort by Saudi Arabia to use the AWACS to direct a Pan-Arab attack is less credible than the "Saudi only" scenario due to additional technical and operational problems relating to multinational training, equipment interoperability, battle management limitations, and advance detection by U.S. personnel.

A third scenario, in which the Saudis use the AWACS to provide defense information to Jordanian and Syrian command centers, is more credible, but since data link equipment would not be sold by the U.S. to Jordan, Syria, or Iraq, information would have to be passed by voice. Such a procedure would be less efficient than real-time data links and would, according to U.S. sources, provide front-line Arab states with only slightly better information than that available from mountain-top, ground-based radar stations in Jordan and Syria. Other data transmission approaches, for example, TV monitors which relay pictures of Saudi radar scopes to neighboring states, would probably be discovered by U.S. personnel.

A fourth scenario involves a purely defensive use of the Saudi AWACS and F-15s. By establishing a combat air patrol inside the Saudi border while other Arab planes attacked Israel from other directions, Saudi Arabia could tie down some Israeli fighters. While such an operation entails risks for the Saudis, it might appear an attractive option if they decide they have to make at least a token military contribution to an air war.

In peace time, AWACS might provide Arab states with additional intelligence information on Israeli air combat tactics, but at the price of abandoning AWACS orbits near the Persian Gulf for near round-the-clock surveillance of Israel. Were the Saudis to engage in a repeated pattern of monitoring Israeli airspace with the AWACS, they would also likely invite political confrontation with the United States.

Despite the technical and political problems inherent in each scenario, Saudi Arabian ownership of AWACS and a long-range F-15 capability would place it under significant Pan-Arab political pressure to use its new capabilities in time of war. Under these circumstances, Israeli Air Force personnel are forced to develop worst-case scenarios that can complicate their defense planning and might bring Saudi Arabia into any next Middle East war against its will.

IV. Additional Considerations

A. Political Implications for Israel of the Sale

In discussing the proposed sale of AWACS and F-15 enhancement equipment, Israeli analysts both in and out of government are concerned that the overall balance of power is tipping against them because of economic and political factors. These factors include the Arabs' oil leverage, which translates into the ability to purchase the latest in Western military technology and to hire foreign technicians to help maintain the sophisticated equipment.

Israeli attitudes on the proposed sales are also affected by their sense of history of arms sales and conflicts in the Middle East. Maintaining a military edge over the numerically superior Arabs has been a constant problem for Israeli planners, dating back to the nation's founding in 1948.

The Israelis see the 1978 F-15 sale and the proposed AWACS and F-15 enhancement sale -- now being pressed despite the 1978 assurances -- as a further erosion of

their relationship with the U.S. Some Israelis question now whether the U.S. remains willing to help her keep a sufficient edge over the Arab forces.

B. Saudi Political Stability

Two years ago, in the wake of the Shah of Iran's fall, the Mecca incident and riots in the oil-rich Eastern province, concerns were voiced about the stability of the Al Saud ruling family in Saudi Arabia. Nevertheless, U.S. officials and many foreign observers in Saudi Arabia are confident that the Saudi government has weathered the shocks of the past two years and learned some important lessons. There is some continuing concern over long-term trends and possible developments during the coming decade.

C. Understanding Related to the Sale

The Administration has announced that it has developed understandings with Saudi Arabia related to:

-- The transfer to third countries of AWACS equipment and data;

-- Exchange of mutually beneficial defense information;

-- Stringent security for the protection of AWACS; and

-- The geographic area in which the Saudi AWACS will operate.

As of this writing, the staff has not been briefed on the details of these understandings and hence cannot assess their adequacy in addressing various concerns about the proposed sales.

Congressional concern has recently prompted the Administration to re-examine the means by which the U.S. could share or monitor the defense information received by the Royal Saudi Air Force (RSAF) AWACS during normal peacetime operations after the U.S. AWACS deployment ends. The most obvious solution would be to have U.S. military personnel on board the RSAF AWACS during all flight operations. The U.S. personnel would have to have full authority to monitor all consoles in the RSAF AWACS, since any single AWACS console can be programmed not to depict specific data or track information.

If the Administration is unable to convince the Saudis to permit a U.S. presence on board their AWACS, U.S. military personnel could attempt to monitor AWACS data from the ground via any one or combination of three approaches: (1) a TADIL A downlink Ground Entry Station (GES) exclusively manned and operated by the U.S.; (2) U.S. observers or liaison officers present in RSAF Sector Control Centers (SCCs); or (3) a Message Processing Center (MPC) exclusively manned and operated by the U.S. that receives AWACS data "second hand," via TADIL B data links from the RSAF SCCs. The report examines the principal limitations of each of these three approaches.

D. Security of AWACS and the AIM-9L Technology

The Saudi AWACS will have several items of sensitive equipment deleted but still contains equipment valuable to the Soviets if compromised. Stringent security measures will be required if the sale is approved. Capture of or access to a U.S. AWACS presumably remains high on the list of Soviet intelligence targets, but there are limits to what the Soviets would gain.

The Saudi AWACS will not be delivered until late 1985. If compromised immediately after delivery, the Soviets could use the technology in their own AWACS, the CANDID-derivative, by the end of the decade. The radar technology would then be more than 20 years old, but it could still prove useful to the Soviets if they were willing to redesign existing aircraft. It is likely, however, that by then the Soviets will have incorporated technology in the CANDID-derivative more advanced than that represented by the Saudi AWACS.

A second concern is that loss of a Saudi AWACS would help the Soviets design jamming systems to defeat U.S. AWACS. Loss of an AWACS would give the Soviets access to signal processing techniques and unique ECCM features which cannot be determined by external observations. Such knowledge might lead to Soviet "smart jamming" techniques.

However, certain features of the AWACS logic system could be modified to alter system parameters and avoid degradation. Other advanced features are also available to counter any Soviet smart jamming capabilities. Therefore, any Soviet gains in the area of radar jamming would be costly for them and could be countered by U.S. technology.

The AIM-9L may present a more serious danger of security compromise because of its advanced seeker and fuze technology. The seeker and fuze technology allows this version of the Sidewinder missile to be fired at enemy aircraft from any angle, rather than only from the rear. While the Soviets are aware of the basic cooling technology involved, they do not yet have the manufacturing capability to produce a comparable all aspect missile. If the missiles are sold to Saudi Arabia, very stringent security procedures would need to be developed specifically for the AIM-9L.

E. Personnel and Maintenance Requirements

Absorbing AWACS and the KC-707 tanker will strain Royal Saudi Air Force (RSAF) manpower during the period 1985-1987. Since the AWACS program is of high priority to the Saudis, the AWACS personnel schedules are likely to be met, but probably at the expense of other programs.

Because of these shortfalls and the high skill levels required to maintain AWACS, an estimated 480 American contractors and 25 USAF personnel will be needed for the Saudi AWACS program in 1985. In addition, 270 American contractors will be needed for the KC-707 program. These contractors, plus the 35,000 line items of spare parts normally required to maintain AWACS, should provide the United States with leverage over the use of AWACS.

The AWACS and KC-707 contractor support program will exacerbate a situation which may some day create problems for the United States. There are now over 40,000 Americans in Saudi Arabia, which compared to the Saudi population, is seven times the ratio of Americans to Iranians in the Shah's Iran.

F. Impact on U.S. Force Readiness

With the exception of the AIM-9L, all components of the AWACS/F-15 enhancement package would come from new production and entail no draw-down or diversion of U.S. systems. Since the U.S. will be retiring AIM-9L missiles in favor of the AIM-9M, the Saudi AIM-9L sale would be from existing U.S. inventories and would in effect subsidize the cost to the U.S. of upgrading its short range air-to-air missiles.

While the Saudi AWACS/F-15 enhancement package entails no adverse impact on U.S. force readiness in terms of the hardware provided, it could have a negative effect on U.S. Air Force retention rates for skilled AWACS radar maintenance, computer support and systems operator personnel. Saudi Arabia will depend heavily on U.S. contractor support in training systems operators. Assuming Boeing were to receive the AWACS training contract and were to offer lucrative contracts to those signing up for the Saudi AWACS training and maintenance program, the already inadequate manning levels for trained personnel in the U.S. AWACS wing could be further lowered.

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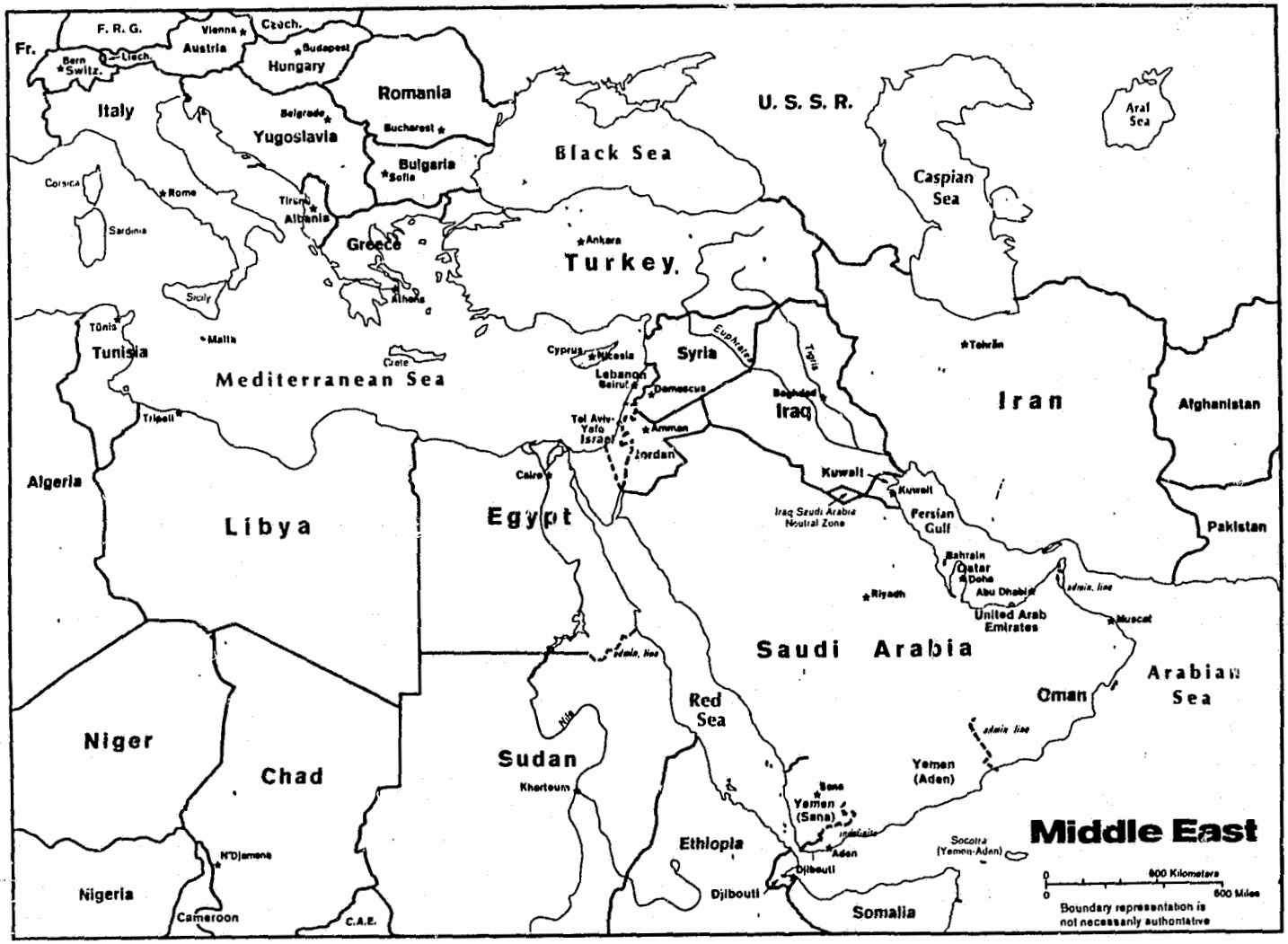
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PREFACE

In anticipation of the submission of the proposed Saudi AWACS/F-15 enhancement package to Congress for review, Senators Charles Percy and Claiborne Pell, the Chairman and Ranking Minority Member, respectively, of the Committee asked members of the staff to visit Saudi Arabia and Israel on a fact-finding mission on behalf of the Committee. The staff delegation was composed of Hans Binnendijk, George W. Ashworth, Robert Bell, and Michael Kraft.

We visited three cities in Saudi Arabia -- Dhahran, Riyadh, and Jiddah -- between August 21 and 27. We were in Tel Aviv and Jerusalem between August 27 and September 1. In Dhahran, we held discussions with Consul General James M. Ealum and his staff; Major General Neil L. Eddins, Chief of the United States Military Training Mission (USMTM), and his staff; representatives of various defense contractors, and officials of ARAMCO, which last year became wholly owned by the Saudi Arabian government. In addition, we held discussions and toured military facilities with Saudi military officials.

In Riyadh, we held discussions with several Saudi officials, American embassy personnel, and various members of the American community in Riyadh. We spoke at length with USMTM officers and personnel assigned to the AWACS detachment in Saudi Arabia, ELF-1. Following extensive briefings on the ground, we flew with the crew on an AWACS mission on August 25.

In Jiddah, we met with Ambassador Richard Murphy and his staff, two European ambassadors, and several senior Saudi officials.

In Israel, we held discussions with Ambassador Sam Lewis and his staff, Major General David Ivry, Commander of the Israeli Air Force, Major General Yehoshua Sagi, Director of Military Intelligence, Major General Natti Sharoni, Chief of Planning, Israeli Defense Forces, Major General Avraham Tamir, Assistant to the Minister of Defense for National Security; foreign ministry officials, and other prominent Israelis, including retired General Mordechai Gur and retired General Aaron Yariv and members of the Center for Strategic Studies.

This report examines the principal foreign policy and national security issues raised by the proposed sales. It is based on discussions during the trip, as well as meetings and briefings conducted both prior to and after the trip, in Washington and Tinker AFB, Oklahoma.

I. BACKGROUND

A. Details of the Package

On August 24, 1981, the Executive Branch provided advance notification of the Administration's intention to sell to Saudi Arabia AWACS, and related ground radar equipment, aerial refueling aircraft, AIM-9L missiles, and conformal fuel tanks for Saudi F-15 aircraft. According to Undersecretary of State James Buckley, the Administration plans to file formal notification on September 30th. By law, Congress may reject the sale by approving a concurrent resolution of disapproval within 30 days of formal notification of intent to sell.

The package includes:

1. Five E-3A Advanced Warning and Control System (AWACS) aircraft; associated spares and support equipment for three years; three years of contractor provided logistics, maintenance, and training support in Saudi Arabia; USAF and/or contractor provided CONUS training and technical support; a facility site survey; and provision for the design, construction, and supply of required AWACS related ground based Command, Control, and Communications (C3) facilities and equipment, including an appropriate number of ground radars.

Configuration of the Royal Saudi Air Force (RSAF) AWACS will be identical to the standard USAF E-3A aircraft except that the Joint Tactical Information Distribution System (JTIDS), Electronic Counter Counter Measures (ECCM) enhancement and sensitive intelligence information, HAVE QUICK UHF communication modifications, and three additional display consoles included in the latest USAF version will not be included [redacted] "commercial" substitutes for the U.S. Government encryption systems will be provided the Saudis as part of the FMS package.

2. One hundred and one ship sets (202 tanks) of conformal fuel tanks (CFTs) for the RSAF F-15 aircraft. The CFTs are streamlined fuel tanks, two per aircraft, which affix to the sides of the F-15 fuselage. The sale would include spare parts, support equipment, training equipment, publications, and other related support for the CFTs.

3. A quantity of 1,177 AIM-9L SIDEWINDER air-to-air missiles with related spare parts and special test and support equipment.

4. Eight Boeing 707 aerial refueling aircraft, including an initial purchase of six aircraft and an option to purchasetwo additional aircraft; three years' supply of spares and support equipment; three years of contractor maintenance, training, and logistics support in Saudi Arabia; and CONUS training provided by USAF and/or the contractor.

The initial three-year cost of the AWACS sales is $5.8 billion; the conformal tanks, $110 million; the Sidewinder missiles, $200 million; and the tankers, $2.4 million; for a total of $8.5 billion. Since extensive contract support will likely be required well beyond three years, the eventual total cost of the sale will be considerably higher.

According to the Executive Branch, the AWACS would be available to Saudi Arabia beginning 48 months following approval, with all the E-3As, coming from new production. The tankers would be assembled on the same line, with maximum airframe and engine commonality. The first tanker would be available in 40-44 months, with production continuing at the rate of about one a month. The conformal fuel tanks would be available an estimated 27 months after award of the contract, and the AIM-9L missiles would start becoming available in 30 months. The AIM-9L missiles for Saudi Arabia will come from U.S. inventory on a one-for-one exchange basis as the newer version AIM-9L missiles are produced and delivered.

More details concerning each part of the package, including cost, performance and availability data are provided in the Appendix.

B. HISTORY OF THE SALE

In December, 1973, Saudi Arabia officially asked the Executive Branch to undertake a comprehensive survey of Saudi Air capabilities and develop a five to ten-year plan to upgrade and modernize the Saudi Air Force. The Executive Branch responded that such a survey should encompass, not just the air force, but the entire Saudi armed forces. The Saudi government agreed and, in 1974, a 45-man DOD survey team reviewed the needs of the Saudi army, navy and air force. That study, and subsequent American efforts, have habeen the basis for the substantial buildup of Saudi forces and infrastructure which has been undertaken in recent years.*

The largest single category of Saudi spending on U.S. weapons and ammunition has been for combat aircraft. The biggest single sale has been the $2.5 billion sale of F-15 aircraft in 1978. This sale flowed from the major recommendation of the 1974 survey that the Saudis needed advanced fighter aircraft to replace the obsolescent force of British Lightnings. At that time, Iraq was perceived as the principal threat. After lengthy review, including test flights of both the F-15 Eagle and the F-14 Tomcat by Saudi pilots, the Saudis expressed their strong preference for the F-15. At the time, Defense officials were telling the press that they were advising the Saudis that purchase of the F-15 would be difficult to absorb and that the Saudis should build their air defense capability around the less complex F-5E, a fighter already in their inventory. After extensive discussions and negotiations, which eventually involved President Carter, the Executive Branch proposed in 1978 the sale of the F-15s. The sale occasioned extensive hearings and debate. On the basis of certain assurances provided to the Congress and Executive Branch testimony as to intentions, Congress voted to disapprove the sale, the Senate turning down a resolution of disapproval by a vote of 52-44.

A letter from Secretary Brown on May 9, 1978, to Senator John Sparkman, then Chairman of the Senate Foreign Relations Committee, stipulated the following:

"The F-15 we plan to sell to Saudi Arabia will have the same configuations as the interceptor model approved for the United States Air Force."

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*In the period between fiscal 1950 and 1973, the United States sold Saudi Arabia about $213 million worth of weapons and ammunition, $65 million in support equipment, $59 million in spares and modifications, and $1,975 million in support services, for a total of $2,332 million. The next year, primarily because of a naval modernization program and other efforts started even before the 1974 survery, sales began to escalate rapidly. As of June 30, 1981, the cumulative FY 1950-81 total had reached $4.1 billion for weapons and ammunition, $2.6 billion for support equipment, $2.2 billion for spare parts and ammunition, and $25.5 billion for total support services, for a grand cumulative total of $34.4 billion.

The plane requested by Saudi Arabia will not be equipped with the special features that could give it additional range. Specifically, the planes will not have conformal fuel tanks ("fast packs"), i.e., auxiliary fuel tanks that conform to the body of the plane, and Saudi Arabian KC-130 tankers do not have equipment for air refueling of the F-15."

"Saudi Arabia has not requested that the plane be outfitted with multiple ejection racks (MER 200) which would allow the plane to carry a substantial bomb load. The United States will not furnish such MER's."

"Saudi Arabia has not requested, nor do we intend to sell any other systems or armaments that could increase the range or enhance the ground attack capability of the F-15."

In addition, in testimony before the House Foreign Affairs Committee on May 9, 1978, Secretary of Defense Brown was asked whether the United States was planning to provide the Saudis with an aerial refueling capacity for the F-15's. In response, Secretary Brown said: "The F-15 does have a receptacle, but the Saudis don't have an aerial refueling capability with a probe, so they will not be able to refuel the F-15."

A separate letter was sent on February 16, 1978, from Assistant Secretary Bennett to Congressman Lee Hamilton in which the following statements were made concerning the AIM-9L and AWACS:

"The Saudi Air Force is not scheduled to get the AIM-9L all-aspect Sidewinder missile which will be carried on the United States Air Force F-15's."

"An F-15 sale will not lead to the sale of E-2C or E-3A (AWACS). The F-15 has an excellent radar. Were the Saudis to purchase an aircraft with less effective radar than the F-15, they would be more than likely to seek an airborne radar system."

Despite the assurances, the Saudis remained interested in upgrading their air defense. During March and April of 1979, two U.S. Air Force AWACS aircraft were deployed to Saudi Arabia in response to Saudi concerns that the North-South Yemen conflict could spill over. The importance of the AWACS as a surveillance platform was not lost upon the many senior Saudis who were afforded an opportunity to take a first-hand look at the AWACS while it was deployed there. Accordingly, in September, 1979, the Saudis requested a feasibility study to analyze the worth of an airborne surveillance system for the Kingdom.

When he visited Saudi Arabia in February, 1980, Dr. Brzezinski, President Carter's National Security Advisor, was given a list of equipment desired by the Saudis. That list included both F-15 enhancement equipment and the AWACS. On the interagency level, much of the list was approved. However, the Saudis were told on April 23, 1980, that the request for AWACS presented the U.S. with significant problems. They were also told that the U.S. was prepared to conduct an air feasibility study without prejudice to the U.S.' ultimate position on any sales. Nevertheless, Saudi officials began telling American reporters that they had received a commitment that the U.S. would sell Saudi Arabia the AWACS.

On June 26, 1980, in Geneva, Secretary Brown said that the U.S. could not make a commitment on F-15 items at that time and that the nature and timing of sales would be subject to eventual consultations with Congress. The Saudis renewed their request for AWACS at that meeting, and Secretary Brown told them that the air feasibility study would have to occur before any decision could be made. In Geneva, Secretary Brown also told the Saudi Defense Minister, Prince Sultan, that the U.S. was not prepared to loan AWACS to the Saudis, but that the U.S. would be willing to deploy to Saudi Arabia for joint training.

The air feasibility study requested by the Saudis was informally ordered on July 1, 1980, and formally initiated on September 8. The study was completed on December 15, 1980, and provided to the Saudis on March 6,1981. The study made no recommendations; rather, it detailed the number, cost and personnel needs for equipment required to provide full border coverage of Saudi Arabia under each of three scenarios: (1) ground-based radar only; (2) a combination of ground radars and the E-2C "Hawkeye" airborne radar aircraft; and (3) a combination of ground radars and AWACS. The study found that the Saudi radar requirement could be met, respectively, by (1) 48 ground radars, (2) 34 ground radars with 11-15 "Hawkeyes", or (3) 18 ground radars with 5 AWACS. In case (1), though, the Saudis would lack any low-level radar surveillance much beyond 20-30 miles of their borders.

While the study was progressing, the U.S. deployed four AWACS, at the request of the Saudi Arabian government, to Saudi Arabia on October 1, 1980. They were to fly over the Eastern provinces to counter any threats posed by the Iraqi-Iran War. Although the level of fighting in the war has wound down in recent months and there is now only occasional air activity at night, the four AWACS in Saudi Arabia are still required to fly constant surveillance missions. As a

result of the deployments to Saudi Arabia, the VIP tours of the aircraft conducted by such U.S. officials as General David Jones, Chairman of the Joint Chiefs of Staff, and the results of the air feasibility study, Saudi Arabia's interest in the aircraft was reinforced. Thus, their desire to have AWACS and the F-15 enhancement equipment became another test of the U.S.-Saudi relationship.

It is not clear from the record precisely how far the Carter Administration had gone prior to the election toward deciding to provide this equipment. President Carter declared on October 24, 1980, "we will not agree to provide offensive capabilities for the planes that might be used against Israel and that obviously includes bomb racks."

Former Secretary of State, Edmund Muskie, and former Secretary of Defense, Harold Brown, wrote to Senator Carl Levin on April 1, 1981, in response to the Senator's request for information about Carter Administration actions on the various F-15 enhancements and AWACS for Saudi Arabia. This is their recollection as provided to Senator Levin:

> Some time after the November election, the Carter Administration, which had been considering the Saudi request, arrived at a tentative conclusion on how to handle the various elements of that request.
>
> Among the various requests, we were favorably disposed toward an early and positive decision on sale to Saudi Arabia of conformal fuel tanks and of AIM-9L air-to-air missiles. (These latter are updated version of the Sidewinder missiles already in the Saudi inventory, and had not been the subject of an exchange between us and the Saudis in 1978.) We were also favorably disposed toward an eventual future sale of AWACS.
>
> Our conclusions were based on the changed situation in the Gulf since 1978, on U.S. military estimates of Saudi needs, on possible implications with respect to the military security of Israel, and on our judgment of U.S. security interests. A member of the Reagan Transition Team authorized to speak for the President-Elect was asked whether the new administration would care to make a joint representation with us to the Saudis on this matter. The answer given was that they did not wish to do so. Under those circumstances, The Carter Administration concluded that it

could make no firm decision, either affirmative or negative, on any of the items requested. We told the Saudis that we would convey our conclusions to the new administration when the new senior officials had been named and would, with the agreement of those officials, begin consultations with the leadership of the new Congress.

> Subsequent to the designation of a new Secretary of State and Secretary of Defense, further discussions were held by the two of us with those designees. The incoming administration then concluded that it wanted to review the situation itself, and take a decision in consultations with Congress after taking office on January 20.
>
> The Carter Administration thereupon informed the Saudis that we had indicated our views to the new administration, that they wanted to take an independent look at the problem, and that the Saudis would be hearing from the new administration thereafter.

Thus, the Carter Administration indicated its views on this matter to its successors, but neither bound the American government nor precluded the new administration from doing its own evaluation of the proposed sale and reaching and independent decision - which the Reagan Administration did.

On February 26, 1981, the Administration briefed the Foreign Relations Committee in closed session on the basic outline of its decisions on the new Saudi arms package. Under Secretary of State Buckley testified that the Administration had agreed to sell Saudi Arabia AIM-9L missiles and conformal fuel tanks and had reached agreement in principle on selling the Saudis an airborne radar surveillance capability and aerial tankers. Secretary Buckley also advised the Committee that the Administration would continue to study the Saudis air-to-ground weapons needs, and that no decision had yet been taken with respect to multiple-ejection bomb racks. In the hearing, the Administration agreed that recent developments in the Persian Gulf region had created new threats to the security of Saudi Arabia's oil resources, and that in light of those "changed circumstances," the 1978 assurances had in large measure been superceded.

On March 6, the State Department made these decisions public and announced that the Administration would "shortly give notification to the Congress" of its intention to sell the additional military equipment to Saudi Arabia. On April 21, the White House announced that the proposed package specifically included the AWACS.

II. U.S.-SAUDI RELATIONS: IMPLICATIONS OF THE AWACS DECISIONS

The proposed sale of AWACS has been described as a litmus test of U.S.-Saudi relations. There is no doubt that the Saudi government attaches great importance to the sale, and that the outcome of the controversy will have both temporary and longer-term implications for U.S.-Saudi political and economic relations. Disapproval could adversely affect U.S. plans for the defense of the Persian Gulf region. The gravity, extent and duration of the longer-term impact, however, could also be affected by other possible overriding developments and events in the region, such as the situation in Iran, Soviet activity in the area, or new developments in the Arab-Israeli dispute.

A. Political

Despite many obvious and continuing differences as to how best to achieve peace in the Middle East, relations between the United States and Saudi Arabia remain close. The Saudis have consulted closely with the United States on a number of Middle East peace issues and continue to do so in the present. They have worked closely with the United States in recent months in efforts to institute the cease fire in Lebanon and to encourage stability. Their influence is enhanced by continuing heavy financial support of the Lebanese government, Jordan, the PLO, and the Syrian forces in Lebanon. In addition to regular support, they have provided additional funds in extraordinary circumstances. For example, Following the Israeli attack on the PLO headquarters in Beirut earlier this year, the Saudis contributed an additional $20 million to the PLO. In past years, the Saudis had supported Egypt heavily, and they backed President Sadat's peace efforts in the years immediately following the 1973 war. However, despite U.S. urging, they have not been supportive of the Camp David Accords. They have stopped financial support of President Sadat and increased support to Jordan and Syria since Camp David.

In August of this year, the Saudis announced a peace plan which called for the creation of an independent Palestinian state, the withdrawal of Israel to its pre-1967 borders, and the rights of Palestinians to return and/or obtain compensation. The plan also called for the right of all states in the region to live in peace. The plan is still being studied by U.S. and Arab officials and has received a mixed and guarded response from the Israelis.

Administration officials believe that the Saudis will be more supportive of the peace effort if Congressional approval of the sale demonstrates to the Saudis that the United States is willing to support them. However, the Saudis will continue to be wary of aligning themselves with the United States on issues which seem to have the United States and Israel on one side and other Arab nations on the other. They will hope for and seek U.S. cooperation but go separate ways when they believe their relations with the other Arab states make that necessary. While the Saudis will consult with the United States to avoid polarization on issues, most observers believe that they will continue to see it as being in their interest to take public stances which are compatible with the sensitivities of other Arabs, including radicals, on settlement issues. The Saudis will continue to place high priority upon solution for Jerusalem and settlement of the Palestinian issue.

Saudi officials tend to underscore their hope that peaceful solutions can be found. They clearly believe that a failure to resolve the Palestinian issue and continued conflict are threatening to them, and that increased Arab radicalization is not in their interests and could undermine their regime. They can be expected to continue to use their estimated $4 billion economic aid in ways which they believe will enhance stability.

Observers in Saudi Arabia suggest that the effect of an adverse reaction might not necessarily be abrupt. It is more likely, they say, that it will have a gradual impact on decisions and attitudes down the road. "We would not take revenge, but psychologically we would feel our friend has failed us", one foreign ministry official said in discussing U.S.-Saudi relations.

In a New York Times interview in February as he was leaving his post, as Ambassador to Saudi Arabia, John West was quoted as saying, "The relationship between the United States and Saudi Arabia is today as good as it has ever been in my judgment. But we are walking on a very tight rope, we are on the edge of a cliff and the relationship could deteriorate very rapidly."

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During our discussions in Jiddah, [redacted] said that bilateral relations have not deteriorated and none was expected, "especially if you reciprocate in arms". He also said that in international politics, "We have to give and take. We are giving, so we also have to take."

The impact of the AWACS issue on U.S.-Saudi relations is also linked to the Kingdom's prestige and influence with its neighbors. This was acknowledged by a Saudi foreign ministry official when Committee staff discussed the question of whether it would be better for all parties concerned to continue the present arrangement under which the U.S. Air Force owns, controls and operated the AWACS. He said that to have Saudi-owned AWACS is more important for his country's prestige in the area and that continuation of the current U.S. AWACS deployment would mean that the Saudis would not be fully accepted as a leader.

U.S. observers believe that the AWACS sale, now that it has gone public, also involves prestige and standing within the Saudi government itself. An adverse decision could hurt relative influence or standing of [redacted] others who have a basically moderate, pro-Western orientation and support the sale. Although it is an over-simplification to view the inner ruling circles as sharply divided into pro-American and less friendly groups, these observers believe that a denial of the sale might make advocates of the purchase vulnerable to suggestions that they cannot deliver on their "American connection".

In various interviews with the press and in private meetings, Saudi officials have said the final U.S. decision on the AWACS would be taken as an important sign of whether the U.S. is serious about supporting Saudi Arabia's security. Congressional approval of the AWACS undoubtedly will be a boost for U.S.-Saudi relations at least in the short run. One senior Saudi official, however, already has been quoted as saying the U.S. should not expect any favors for doing what it should have done earlier. How lasting any positive effect of a sale will also obviously depend on other circumstances.

B. Economic

A concern actively being raised by the Administration and American businessmen involved in Saudi Arabia is possible adverse economic consequences if Congress refuses to go along with the AWACS sale.

One question mark is whether the AWACS decision will have an impact on future Saudi oil prices and production policies. This, in turn, is related to the broader question of whether oil decisions are significantly affected by political considerations rather than economic forces. Another question concerns the impact on U.S. contracts and trade.

1. Oil

Saudi Arabia had estimated oil reserves at the end of 1980 of 168 billion barrels, enough to last almost 50 years at present production levels of less than 10 million barrels daily. ARAMCO, the Saudi-owned company, maintains a vigorous exploration program. Saudi Arabia is second only to the Soviet Union in oil production, and leads the rest of the world in oil reserves. It exports more than 3 times as much oil as its closest exporting rival, the Soviet Union. By comparison, the U.S. which ranks third in oil production and eighth in reserves, is the top oil consuming country. Twenty-five percent of U.S. oil imports come from Saudi Arabia.

Because of its pre-eminent position as a supplier, it is clear that Saudi decisions on oil production levels are of critical importance to the West. It is expected that Saudi Arabia will remain the country most critical in determining world oil production and price levels. Until recently, Saudi economic and political interests and the willingness to compensate for drops in production by Iraq and Iran kept daily production at a level above 10 million barrels per day. Recently it has dropped to about 9.5 million a day in the face of pressure from other producers and the worldwide oil surplus. Nevertheless, the Saudis have continued to be the country which has taken the lead in keeping the lid on oil prices.

Most U.S. specialists in the matter think it is unlikely that an adverse Saudi reaction would manifest itself in oil policies. This is because of overriding forces in the oil market -- including the current glut and softness in prices, the increasing production capabilities of non-OPEC countries, and Saudi Arabia's requirements for revenues and a growing amount of natural gas needed for the nation's burgeoning electric power and petrochemical industry requirements. In early September, as the AWACS debate was just getting underway, the Saudis cut oil production by about 10 percent and the Oil Minister Sheik Ahmed Yamani, said he did not think it was possible for Saudi Arabia to raise prices in the next few years.

Aside from revenue considerations, there is another major factor in determining production levels -- and that involves gas production. The industrial development plans would involve using large quantities of natural gas for the electric power and petrochemical facilities. Currently all the gasis produced in association with the oil. Oil experts say that in order to produce enough gas to meet the requirements, the minimum oil production will have to be kept near to the 8.5 MBD mark. Thus, if Saudi Arabia takes some economic reprisal for an adverse AWACS decision, from a logical basis it is more likely that the impact would be felt outside the oil arena.

2. Trade and Other Economic Areas

At present, Saudi Arabia is the ninth largest world market for U.S. exports. In 1980 it was estimated at $5.8 billion in goods and another $1 billion in services. At present, there are 450 U.S. firms doing business in Saudi Arabia, with over 40,000 Americans working there.

Saudi foreign monetary assets are now estimated at about $110 billion and are expected to grow to $150 billion by the end of the year. Saudi Arabia follows a conservative fiscal policy and keeps large amounts in government securities and other assets. The largest portion of its surplus is expected to be placed in dollar denominations, bank deposits, and treasury notes. Although most holdings are in dollars, Saudi Arabia is expected to continue to diversify its holdings to include large portions of yen, German marks, Swiss francs, British pounds, and French francs.

American businessmen in Saudi Arabia say they fear they will lose future contracts if the AWACS sale is not approved. They, and U.S. Embassy officials, say there is unlikely to be a sharp, dramatic breaking of contracts with American firms. More likely, they predict, when future major contracts come up in tightly competitive situations, the nod may go at least temporarily to non-American bidders when other factors are roughly equal. It is hard to predict how long such a bias, if it develops, would be likely to last.

C. Regional Defense

U.S. plans to protect vital western interests in the Near East/Southwest Asia region have changed dramatically in recent years. Decisions to be made on the AWACS sale to Saudi Arabia could have a significant impact on U.S. plans to increase security co-operation

in this critical region -- a region which currently is subject to multiple strains:

-- a perception by Western-oriented nations in the region of encirclement by the Soviet Union and its allies due to increased Soviet military capability and a Soviet willingness to use military force to achieve its goals, as demonstrated by its occupation of Afghanistan,

-- the clash between Islamic fundamentalism and modernization that contributed to revolution in Iran, the Mecca Mosque crisis in Saudi Arabia, religious clashes in Egypt, and Islamic law in Pakistan;

-- regional clashes that tend to align pro-Iraqi Arabs (Saudi Arabia, Jordan, the smaller Gulf states) against pro-Iranian Arabs (Syria and Libya);and

-- the Palestinian issue which has isolated Egypt from most of the Arab world, makes most Arabs cautious in their dealings with the United States, and could radicalize more of the Arab population if time passes without a resolution.

U.S. policy in the region must be designed to take all of these factors into account if western interests are to be protected.

The Reagan Administration seeks to address each of these problems, but places its greatest emphasis on the first. It has actively sought to gain a strategic consensus with key Western-oriented states in the region (Israel, Egypt, Saudi Arabia, Pakistan, the Sudan, Jordan, Somalia, Oman, and others) that the major threat to their security is the Soviet Union. Staff visits to these countries during the past year confirm that there is a basis for developing a consensus on the Soviet threat, but that the other strains mentioned above limit the extent to which such a consensus might be implemented.

In the Administration's view, a credible capability to project U.S. military power into the region is required if the strategic consensus is to be implemented. This has required dramatic changes in U.S. defense policy which in previous decades relied on the British and later Iran to assume principal defense responsibilities in the Persian Gulf region. Because of recent Soviet gains, friendly states in the region now feel that without credible U.S. power projection capabilities, they will be at the mercy of Soviet opportunism. Yet development of that U.S. capability has encountered several problems. For example:

-- The U.S. has gained limited access to military facilities in Oman, Somalia, Kenya and Egypt; however, Saudi Arabia is for various internal and foreign policy reasons unwilling to make similar commitments. [redacted] b1 a5

-- In peacetime, the U.S. presence in other countries must have low visibility to minimize the risk of political disruption in the host nation and to reduce fears that U.S. force might some day be used to seize the oil fields or against Arab countries, rather than against the Soviets.

-- The U.S. Indian Ocean Fleet (Task Force 70) is stretched to its limits by logistics problems, personnel fatigue, and naval requirements elsewhere in the world.

-- The Rapid Deployment Force has serious air and sea lift problems that require time, money, and local equipment prepositioning to solve.

The Reagan Administration hopes that a balanced U.S. policy toward Israel and its Arab neighbors, it can help solve many of these problems and facilitate a strategic consensus in the region. The Administration hopes that the AWACS sale will provide at least some of the Arab world with confidence in the reliability of American might -- a confidence that has been severely shaken during the past several years due to U.S. policies in Iran and Africa. Having regained the confidence of these key Arab states, the Administration hopes to develop informal access to additional military facilities in the region and to be in a stronger position to deal with the Palestinian problem.

It further hopes to advance the prestige of Saudi Arabia, in the expectation that the Saudis can continue to play moderating roles in regional conflicts as they did in the case of Lebanon.

With respect to the Israeli side of this equation, the Administration proposed a new strategic relationship with Israel during Prime Minister Begin's recent visit. The Administration believes that this new strategic relationship with Israel can provide valuable prepositioning for U.S. equipment while at the same time giving Israel an enhanced sense of security, although it is too early to tell just how the new strategic relationship will be developed. This strategic relationship with Israel, however, runs the risk of alienating most Arab nations unless other means are found to build similar confidence in the U.S. among Arabs.

The Saudis appear to share the Administraton's perception of the Soviet threat to the Middle East to a major degree. [

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Accordingly, the large Saudi military purchases are justified, we were told, to help protect Saudi Arabia from the Soviet military ambition as well as the designs any others might have against the kingdom, in general, and the oil fields, in particular.

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The Saudis understand that they cannot stand alone against the various threats they perceive. One Saudi official estimated that the kingdom, with all that it is buying, could defend itself against the Soviet Union for two or three days at the most. Accordingly, they crave a close military relationship with the United States. As one official put it, the Saudis

attach far greater importance to the relationship with the United States than the arms can provide, rather than the arms themselves. However, they believe that U.S. bases on Saudi soil would put them in an untenable position with their Arab neighbors, as would U.S. ownership and control of major equipment. We were told, "To have our own AWACS is much better with our Arab neighbors. It is much more prestigious." Essentially, the Saudis seem to be seeking a military relationship with the United States which involves the massive sales of equipment, advice, training, and exchange of information -- "anything which does not degrade Saudi Arabia in the Arab world." One senior official said, "we consider that the security of Saudi Arabia is the security of the West, and the other way around."

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III. SAUDI AIR DEFENSE REQUIREMENTS

A. Threat Assessment

Because of its relatively scattered population, limited manpower resources for military service, and vulnerable oil fields, Saudi Arabia appears, at least on the surface, a potentially inviting target. The Saudis feel themselves surrounded by states with varying levels of ties to Moscow or potential for control by the Soviet Union. The Saudis hold no illusions that they could stand alone against a dedicated Soviet attack. However, this scenario is regarded as far less likely than hostilities with neighboring states.

Relations with its immediate neighbor to the north, Iraq, while dramatically improved recently, have not been normally friendly over time. Iran, which, under the Shah, was building a military establishment which made the Saudis uneasy, has now become a state which some Saudis see as presenting a real potential threat. While the Saudis are stronger than South Yemen, there is the possibility of at least border skirmishes and, possibly, subversion from that quarter.

Should the Israelis feel threatened by Saudi Arabia to the point at which military action might be undertaken, their air force has the greatest capability among Middle East air forces to inflict military damage on the Saudis. Most analysts do not believe that Saudi Arabia could protect itself from an attack by Israel, either with the present forces or any envisionable air force.

Saudi Arabia probably could defend itself against South Yemen or against a limited attack by Iraq. There is a question, however, whether, on a strictly military basis, an attack by Iraq is likely. A major problem for Iraq is its difficulties with its neighbors, Iran and Syria. Any tank attack by Iraq upon Saudi oil fields around Dhahran would be difficult without air support, and such an offensive would be at the limits of the combat radius of Iraq's MIG-23s. Iraq's own fields and shipping lanes would, of course, be vulnerable to counterattack.

The likelihood of the Iraqis' desiring such an attack has been reduced recently. The Saudis believe that the weakening or ruination of Iraq would increase the threat posed to them by Iran.

[redacted]

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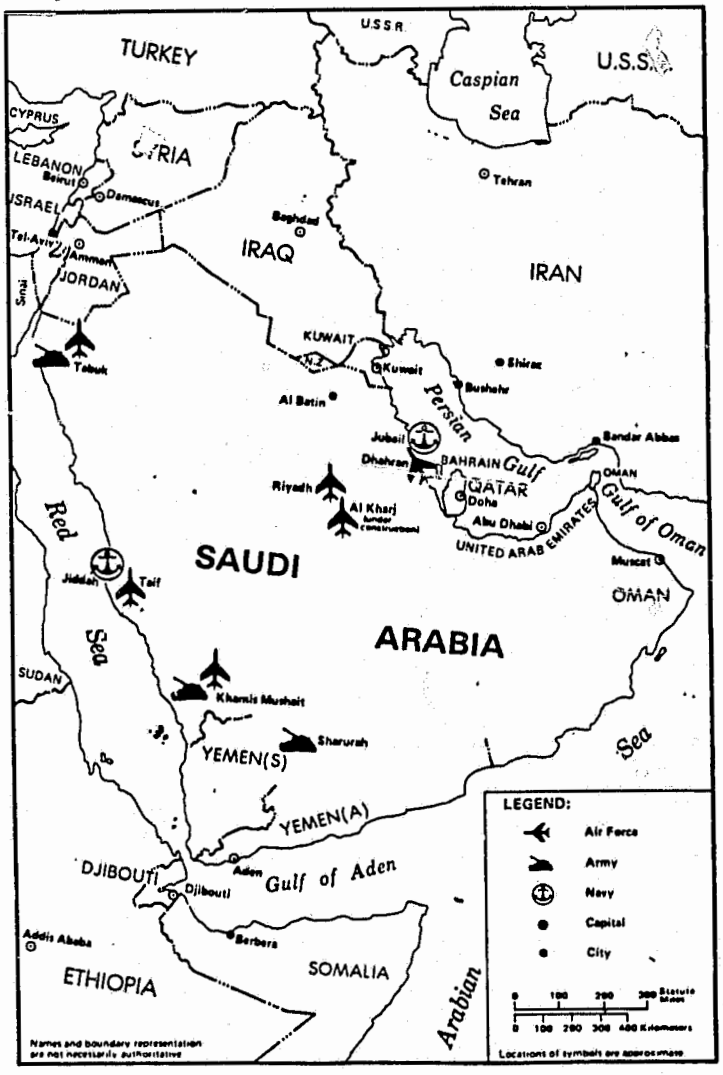
MAP 1

Major Saudi Military Installations



Map prepared by the Congressional Research Service

Since Iran has had significant losses in the course of the war and has suffered a toll on its military capacity, the likelihood of significant military action against Saudi Arabia has been diminished. However, the Saudis have in mind the fear that the Iranian leadership might need to improve morale or divert public attention and would decide to strike the Saudi oil fields. Both Saudi and American observers tend to believe that the ties Saudi Arabia is trying to forge with the US will not sit well with Iran, which can be expected to be anti-American for some years to come. The following section examines Saudi Arabia's capability to defend against an attack by Iran.

B. The Role of the AWACS and F-15 in Defense of Saudi Oil Fields

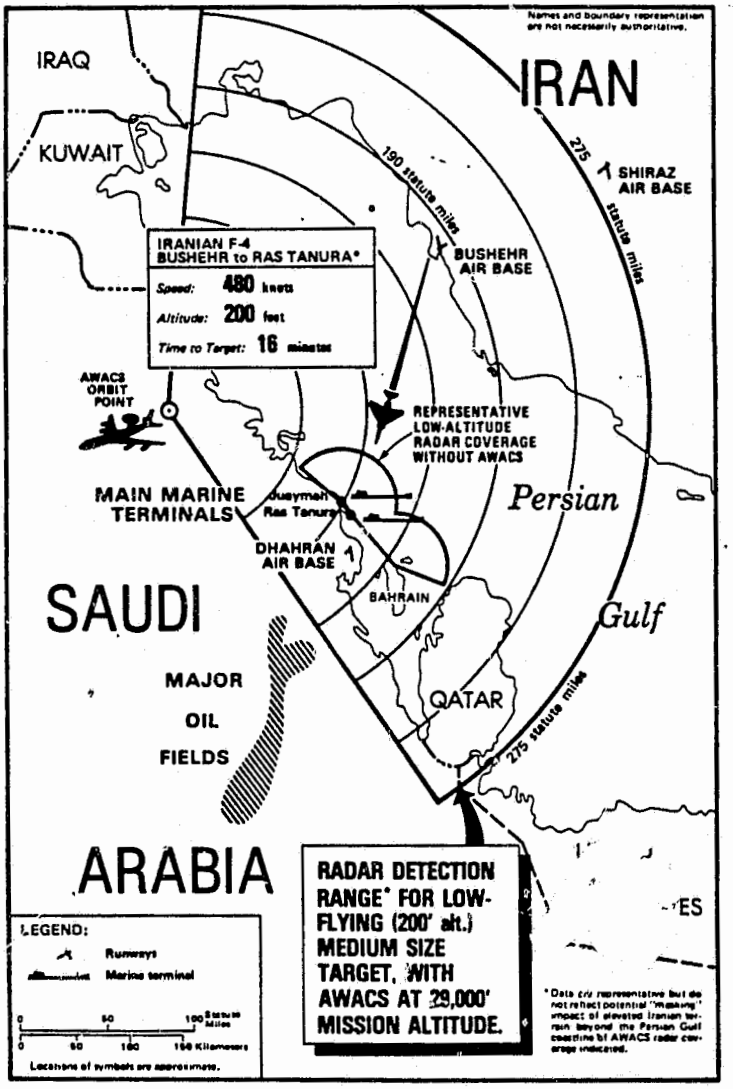
1. The Time/Distance Problem

The key difficulty of Saudi Arabia's air defense problem is that its most vital economic/industrial assets, the marine terminals at Ras Tanua and Ju'aymah (which together account for the trans-shipment of 95% of the country's crude oil exports), lie at precisely the closest geographic point to its principal military threat, the Iranian air bases at Bushehr and Shiraz (see Map 2). Only minutes inland are located the key component facilities in Saudi Arabia's multi-billion dollar natural gas development project, the Master Gas System, which when completed will produce 3 billion cubic feet per day of natural gas, propane, butane and ethane.

For Saudi military planners, this unfortunate coincidence of geography and politics can be reduced to a simple, but extremely tasking, time and distance calculation: an Iranian F-4, flying at 200 feet and 480 knots, can bomb the Sea Island at Ras Tanura or the offshore mooring stations at Ju'aymah only 16 minutes after taking off from Bushehr. Should the enemy fighter loiter peacefully within Iranian air space over the Persian Gulf, then suddenly veer directly for Ras Tanura, Saudi reaction time is reduced to perhaps eight or nine minutes.

MAP 2

Iranian Air Attack Scenario



Map prepared by the Congressional Research Service

In addressing this problem, Saudi air force commanders must take into account the fact that intercepting an enemy air attack involves more than just the intercept itself. Specifically, there are five steps in the air defense process, any one of which if delayed or misjudged can spell disaster in protecting the oil fields:

-- Detection. The first task, obviously, is to recognize that a potentially hostile target is airborne. Since relying on visual sightings has been obsolete since the development of jet aircraft, detection of aerial targets must be accomplished using radar. Radar detection is a function of target altitude and size. The higher the target, the greater the distance at which it can be "seen" by the radar; the larger the target, the better the chances become of receiving a discernable radar return. Radar operates on a "line of sight" principle, thus a low-flying aircraft is screened by the curvature of the earth at ranges beyond 25-30 miles. Only by elevating the antenna can the radar extend its horizon significantly beyond this distance.

-- Identification. Once a radar operator "sees" a target on his scope, he must attempt to determine its identity, or at least to categorize it as "potentially" or "probably" hostile. In wartime, one can assume that any target detected coming from a certain area is probably hostile, but in peacetime a specified sector of airspace is likely filled with numerous commercial, private and military aircraft. By using Identification Friend or Foe (IFF) and cross-referencing filed flight plans and pilots' radioed position reports, a radar operator can eliminate most targets as non-hostile. For a certain number of targets, though, identity will remain unknown and the determination of possible threat must rest on a more subjective reading of likely intent.

-- Decision. A decision to order an intercept of an unidentified target can be pegged to an arbitrary rule: any "unknown" aircraft that enters a certain zone will be intercepted. This is the approach used by the U.S., which has established an Air Defense Intercept Zone, or ADIZ, which extends in some cases out to 300 miles from the east and west coasts.

In the Saudi case, though, geography does not permit the luxury of such an extensive ADIZ, indeed, no ADIZ at all has been established. The Persian Gulf is only just over 100 miles across, opposite Dhahran, and major air routes connecting Baghdad, Bahrain, Abu Dhabi, Abu Dhabi,

Tehran and other major cities to the Northwest and Southeast lie just miles off the Saudi Gulf coast. Were the Saudis to order intercepts on any unidentified aircraft within, say, 100 miles of the oil fields, the RSAF would be flying around the clock.

-- Scramble.

RSAF F-15s will take over this mission starting in 1982 or 1983. Fighter reaction time could be cut by several minutes by keeping the pilots in the fighter cockpit with the aircraft engines running, but the cost of this approach in terms of jet fuel, engine wear, and pilot fatigue make it impractical except in the most dire contingencies.

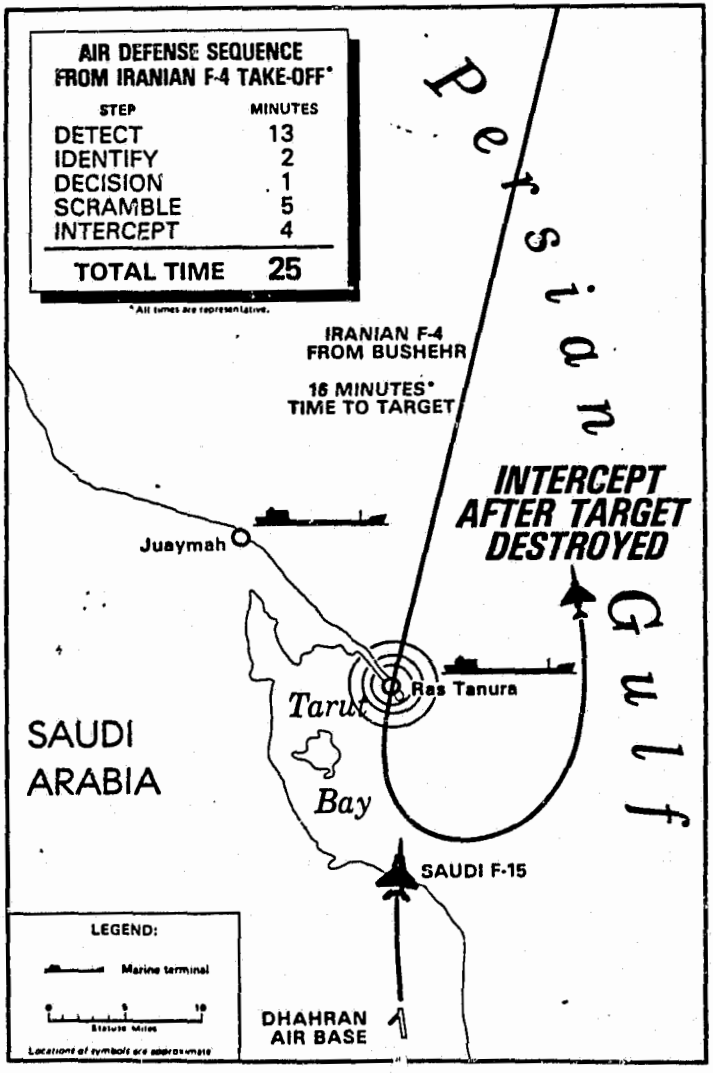
-- Intercept. Once the fighters are airborne, they must engage the enemy. This entails both closing in on the target (Ras Tanura is about 30 miles from Dhahran) and maneuvering into a position from which a short-range infrared homing missile can be fired. As a general rule, it takes longer to get behind an enemy aircraft than to engage it head-on. An RSAF F-15 could launch radar guided AIM-7 Sparrow missile from beyond visual range,

2. The Saudi Air Defense Scenario Without AWACS and AIM-9Ls

Without AWACS, the RSAF must rely on ground-based radars to detect enemy air attacks. In the Dhahran area, with its generally flat coastal plain, radars cannot be sited on elevations much higher than 1,000 feet. As a result, the radar horizon for small, low-flying targets (200 feet) extends only out about 30 miles. As illustrated by Map 3, this means that an Iranian F-4 at 200 feet could fly from Bushehr Air Base for thirteen minutes directly at Ras Tanura before being detected by ground-based radar in the Dhahran/Ju'aymah area.

Map 3

F-15 Intercept With Ground-Based Radar and No AIM-9L



Map Prepared by the Congressional Research Service

Once the Iranian fighter was detected, it would normally take the RSAF about 13 minutes to intercept the target east of Ras Tanura, assuming the interceptors are Dhahran-based F-15s equipped with existing AIM-9-P3 missiles (rear engagement only). However, the Iranian F-4, once detected, would be over the target within three minutes. Thus, even under optimal assumptions, the intercept would occur ten minutes too late. This would force the Saudis to defend the target with missiles and anti-aircraft guns alone. The Ras Tanura/Ju'aymah/Dhahran area is defended by [redacted] army air defense battalions made up of HAWK and Crotale missile batteries and 35mm Oerlikon guns. However, the HAWK batteries normally need about ten minutes warning to fire effectively, and the Crotale and Oerlikon weapons systems would likely be firing "after the fact".

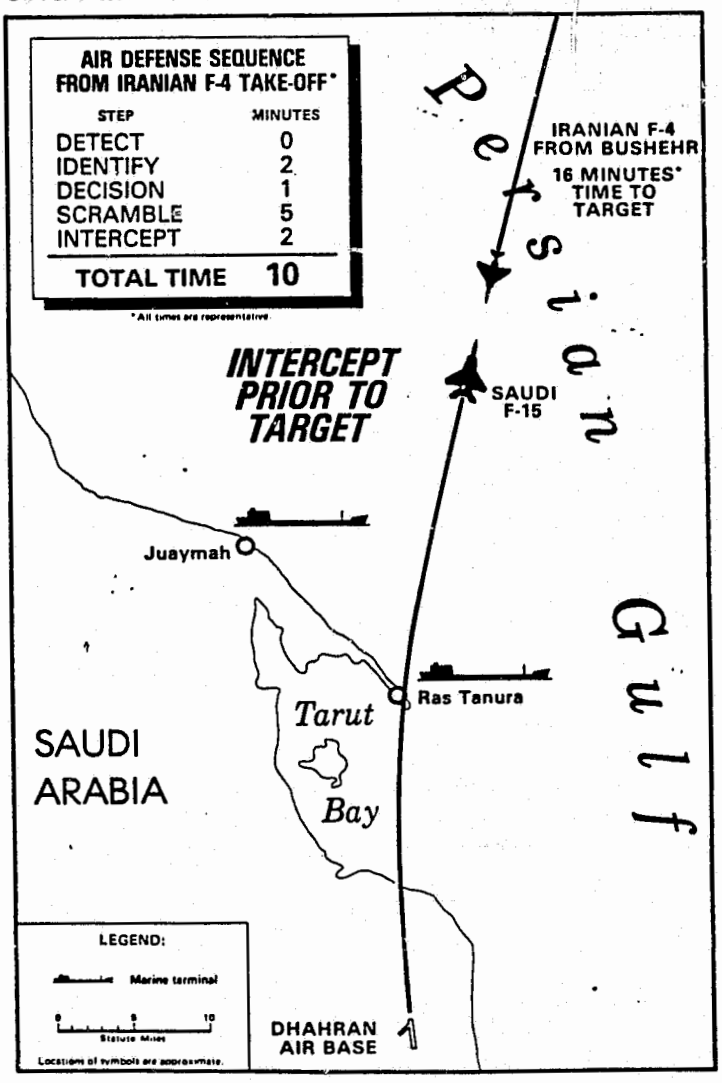
Moreover, to get even three minutes warning, which is admittedly insufficient, the ground-based radar must work perfectly in detecting small, low-altitude targets. However, due to the temperature gradient between the air mass above the hot desert in Saudi Arabia's Eastern Province and the cooler air over the Persian Gulf, ground-based radars experience performance degradations 75% of the time. This phenomena, known as "ducting", could impede target detection until the enemy fighter was virtually on top of the radar.

3. The Saudi Air Defense Scenario with AWACS and AIM-9Ls

Assuming the AWACS is orbiting in Saudi airspace within 50 miles of the Persian Gulf coast, in the northeast corner of the Kingdom, it can observe low-level flight activity at Bushehr airbase and beyond (see Map 2). In this case, the detection time for an Iranian F-4 is zero, since the AWACS radar operator can "see" the F-4 on the Bushehr runway once its takeoff speed exceeds 80 knots. Using the same optimal time/decision criteria employed in the non-AWACS/AIM-9L scenario, the RSAF F-15s could reasonably expect to be in position to fire at a target east of Ras Tanura in 11 minutes, five minutes before the Iranian F-4 would be over the target. In theory, then, the F-15s could complete at least one short-range pass at the approaching F-4 well east of Ras Tanura/Ju'aymah, as illustrated on Map 4. In addition, the advanced warning provided by AWACS would permit the Saudi HAWK, Crotale and 35mm gun batteries to be "at the ready" in case the attackers get by the interceptors.

Map 4

F-15 Intercept With AWACS and AIM-9L



Map prepared by Congressional Research Service

Whether this theoretical capability could be perfectly executed the first time around, though, remains somewhat problematical. For despite the "fighting chance" that the AWACS/AIM-9L combination would give Saudi Arabia, its air defense system could conceivably still be circumvented. Possible Iranian attack options would include:

-- Surprise attack. The Saudis do not plan on keeping an AWACS on station at all times, in peacetime, in the Dhahran area. Rather, the five AWACS would likely be on the ground at the Al Kharj main operating base, except for routine training, maintenance check-out, or proficiency flights or when practicing intercept procedures with fighter units or ground-based radar facilities.

In the event of a crisis, with clear indicators of imminent hostilities, the RSAF could establish and maintain a single AWACS radar orbit over the oil fields (or elsewhaere in the Kingdom) for about seven days without U.S. AWACS reinforcements. To maintain 24-hour AWACS radar coverage constantly in peacetime, or for longer than seven days during a time of political tension, many more than five AWACS would be required.

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-- Helicopter Attack.

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a5

One conceivable Iranian tactic to counter the AWACS would be to attack Ras Tanura with TOW missile-equpped helicopters

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a5

Under this scenario, the Iranina helicopters would probably be fired upon only by the Saudi 35mm gun sites.

-- Deceptive Flight Plans. Regular commercial air service is being maintained between Iranian and Saudi cites, despite the Iranian/Iraqi war. Absent sophisticated ESM equipment (not planned for sale to Saudi Arabia), a Saudi AWACS could not tell from a radar presentation alone whether a target originating from Tehran or Shiraz, purporting to be a civil aircraft complying with a duly filed flight plan to Dhahran or Bahrain, was in fact an Iranian fighter imitating the speed and route of flight of the civil aircraft. At present, RSAF officers at the Dhahran SCC must monitor Bahrain Air Traffic Control (ATC) frequencies to receive pilots' radioed position reports. Once within visual range of the Saudi coast, the fighter could drop its disguise, veer off, and attack Ras Tanura.

-- Reduced Warning Attack. As previously mentioned, Iranian attackers could cut Saudi reaction time, even with the AWACS, by loitering peacefully in Iranian airspace over the Persian Gulf before veering off directly for Ras Tanura. Were the AWACS to become suspicious, though, it could put RSAF F-15s on airborne alert during the Iranian air maneuvers.

C. Use of AWACS Against Other Threats

In 1973, the South Yemeni air force attacked Saudi installations in the Sharurah area and more recently has been engaged against Oman and North Yemen. The South Yemen air force is equipped with Soviet MIG-21s, with more advanced aircraft on order. The combat radius of these fighters would enable South Yemen to strike most targets in southwest Saudi Arabia, but Mecca, Riyadh or the oil fields in the east would be too distant.

To defend against the South Yemeni threat, Saudi Arabia has established an F-5 base at Khamis Mushait, supported by ground-based TPS-43 radar, and redeployed mechanized army units from Tabuk to Sharurah. However, the Saudi air defense system in this sector is handicapped by the short-warning time provided against low-altitude aircraft, as is currently the case in the Dhahran area. At Khamis Mushait, though, ground-based radar is especially limited due to the mountainous terrain. During the 1979 Yemeni conflict, Saudi officials were impressed with the US AWACS' capability to look over the mountains into South Yemen and provide advanced warning of aerial activity.

Should the AWACS sale be approved, the Saudis intend to base the entire AWACS fleet at Al Kharj, to be available for deployment to any sector of the Kingdom under threat of air attack. Were South Yemen to initiate or threaten hostilities against North Yemen or Saudi Arabia, the Saudis could establish an AWACS orbit in the vicinity of Khamis Mushait working in coordination with RSAF F-15s scheduled to be deployed at that base. A similar deployment pattern would most likely be established in the event of a threat from Ethiopia.

Were hostilities to appear imminent with Iraq, the Saudi air defense scenario would parallel that established for use in defending against Iran. In the Iraqi case, though, the Saudis would most likely face the prospect of combined land and air operations by the enemy. As a result, AWACS could be used both to support air intercept scrambles and in coordination with RSAF interdiction strikes against invading Iraqi armor units.

D. Summary

Without the AWACS/F-15 enhancement package, the RSAF would have to anticipate that at least the first wave in an Iranian air attack on the marine terminals at Ras Tanura and Ju'aymah would confront only the ground-based missile and gun defenses, and might well make a first bombing pass without being fired upon at all. Once Saudi interceptor and air defense units were alerted by the attack, subsequent waves of Iranian aircraft would likely be met with substantially more resistance. Given the exposed and fragile nature of the oil and natural gas facilities in the area, though, one pass might well be sufficient to accomplish whatever limited political motive might lay behind such a "bolt out of the blue" Iranian attack.

With AWACS/AIM-9L, the Saudis would have a substantially higher prospect of defeating, or at least deflecting, such an attack. If the AWACS is in position, with its radar operating, and all human links in the air defense intercept sequence perform in a timely and error-free manner, an Iranian attack would likely be engaged by F-15s over the Gulf and fired on by HAWK and Crotale missiles and 35mm guns in the immediate vicinity of the target.

This, of course, provides no guarantee that an attack would not inflict some, perhaps substantial, damage. Even a near miss at Ras Tanura could ignite successive oil tank explosions and damage the basic pumping infrastructure, though successive air attacks would be needed to knock out the overall oil field production capability for a prolonged period. Furthermore, the normal RSAF quick reaction alert fighter force is rather "thin". Two F-15s, no matter how effectively scrambled, could not stop a determined multi-ship Iranian fighter formation.

More troubling to Saudi commanders, though, must be the recognition that the entire AWACS air defense enhancement concept relies on strategic warning. The Saudi Government must note, and act on, early indications of impending attack by mounting a continuous AWACS orbit. If Saudi Arabia is convinced that the probability of attack is high enough to be taken seriously, and no attack comes within the first week, its leaders would face a choice between standing down from continuous orbits (with attendant risks) or inviting U.S. AWACS in to supplement their own fleet. In this sense, then, the purchase of five AWACS provides the Saudis with only a partial step toward self-sufficiency in air defense, against even non-Soviet threats.

Lastly, Saudi and U.S. military planners will need to devise ways to close the aforementioned vulnerability gaps in the planned AWACS operation. The current reliance on monitoring the civil air traffic control frequencies to establish the identity of most air traffic over the Gulf should be replaced by detailed military ATC cooperative procedures. The designation of an ADIZ over the Gulf should be carefully studied. Additional 35mm gun sites in the Ras Tanura/Ju'aymah area might well be needed to defend against the helicopter threat.

No matter what is done to protect against sophisticated air attack, there will remain the threats posed by attack by helicopters, surface ships, infiltration by sappers in small boats, or even sabotage from within. While embassies and companies tend to exercise very tight control, there has been labor and political dissidence in the Eastern Provinces. Sabotage is also a threat posed by workers in the oil fields. There are an estimated 250,000 to 270,000 Shiite Moslems in the Eastern Provinces -- many of whom are dissatisfied with the regime and have hands-on experience with the oil production equipment and its vulnerabilities.

In summary, Saudi Arabia currently faces external threats to its security. Even if hostilities may not appear imminent, the Saudis believe that they must guard against "worst case" attack scenarios. It must be understood, however, that whatever benefits AWACS and F-15s can provide the weapons systems are no panacea or complete solution in protecting Saudi Arabia. Nevertheless, Saudi leaders believe that the AWACS/F-15 enhancement package constitutes an important step towards establishing a credible deterrent against external attack.

E. Alternative Airborne Radar Systems

1. Grumman E-2C "Hawkeye"

The E-2C is the newest version of a Navy airborne early warning and control (AEW&C) aircraft that has been in service since the 1950s. Although originally designed only for maritime operations, the E-2 series has since been equipped with a highly capable pulse-doppler radar for detecting low-flying targets over land. The E-2C has been purchased by Israel and Japan and is being considered by Australia, Egypt and France.

Compared to the AWACS, the "Hawkeye" has a slower cruise speed and significantly less range and endurance (see Table 1). This means that it takes an E-2C longer to arrive at its orbit point and it can remain on station for a shorter amount of time before having to return to its home base for fuel. For example, almost twice as many E-2Cs as AWACs would be required to maintain a continuous orbit 200nm from a home base (a distance which appr ximates the radius of current AWACS radar orbit points from Riyadh). For orbits more than 500nm from the home field, approximately three times as many E-2Cs as AWACs would be needed.

This problem would be minimized if E-2Cs were based near their orbit points.- at Dhahran, for instance, for oil-field defense. The Saudi air defense requirement, though, calls for one home base for the AWACS fleet, rather than dispersed basing around the kingdom. Maintaining the AWACS fleet at one base simplifies the associated logistics, maintenance, and training requirements.

Since the E-2C cannot cruise at as high an altitude as the AWACS, its radar horizon is slightly less than that of the AWACS. As a general rule of thumb, the AWACS detects low-flying (200') targets about 20nm sooner than would an E-2C. In addition, the E-2C's detection range for high-altitude targets is less than that of the AWACS. (See Table 1). The E-2C's over-land heighth finding capability is also less effective than that of the AWACS, and its main radar beam is more vulnerable to jamming.

In other aspects, though, the E-2C has capabilities superior to the AWACS. For example, the "Hawkeye" can use its Passive Defense System (PDS) -- an electronics system not currently installed on AWACS -- to detect and track radar emitters on a wide range of air, land or sea platforms, including such systems as tank fire control systems, artillery spotting radars, and the missile control radars on fighter aircraft.

Table 1
COMPARISON OF E-3A/E-2C/NIMROD AEW AIRCRAFT

	E-3A	E-2C	NIMROD
Endurance			
Unrefueled	11 hrs	6 hrs	10.5 hrs
Refueled	22 hrs	-	-
Orbit Altitude (ft)	29-31K	25K	25K
Crew	17	5	10
Flight	4	2	4
Mission	13	3	6
Consoles	9	3	6
Growth	Yes (12)	No	UNK
Communications			
UHF Radios	14	4	7
VHF Radios	4	-	2
HF Radios	3	2	2
LF Radios	-	-	1
Growth	Yes	No	UNK
Data Links			
Link 11	Yes	Yes	Yes
Link 4	Yes	Yes	Yes
JTIDS	Yes (1982)	Yes (1990)	Future
Detection Range			
Bomber	360 NM	250 NM	270 NM
Fighter (F-4 size)	220 NM	208 NM	185 NM
IFF Range	360 NM	260 NM	260 NM
Electronic Support Measures (protective electronic equip; i.e., radar detection and warning, etc.)	No	Yes	Yes
Data Processing			
Active Tracks	300	300	400
Cross-tell Tracks	500	343	UNK
Fighters Controlled	30	20	30
Target Capacity (Digitized Data)			
Radar/IFF	1500	300/raw video	1000
Maritime Detection Range	220 NM	208 NM	208 NM
SIGINT/ELINT Capability	No	Limited	Yes

Note: The NIMROD AEW system is still under development, and many of its characteristics and capabilities are still somewhat uncertain or speculative.

Source: DoD

SECRET SENSITIVE

The E-2C's PDS could therefore be employed to monitor armor or artillery units, even if they were not moving along the ground. Unlike the AWACS, the E-2C can use its main radar in modes which permit it to track very slow moving objects, including helicopters and standard army vehicles (tanks, self-propelled guns, trucks, etc.)

On balance, the E-2C could be said to have radar, computer and automation capabilities generally comparable to the AWACS; however, the range and endurance limitations of the basic airframe make it more suited to "point defense" scenarios (such as defending an aircraft carrier or a small state like Israel) than for area defense of large land masses. For the whole of Saudi Arabia, the U.S Air Force determined that it would take 11-15 E-2Cs and 34 ground radars to provide radar coverage comparable to that provided by 5 AWACS and 18 ground radars. Lastly, the E-2C's passive electronics detection capability could be perceived by Israel as posing a unique military/intelligence threat. Whatever its advantages and limitations compared to AWACS, though, the Saudi government has never shown interest in purchasing the E-2C.

2. British "Nimrod"

In contrast to its marked lack of interest in the "Hawkeye", the Saudi leadership has repeatedly hinted that it would purchase the British Aerospace Company (BAC) Nimrod airborne radar surveillance aircraft if denied the AWACS. The Saudis have a long standing relationship with BAC as a result of continuing BAC support for the RSAF "Lightning" interceptor and BAC-167 "Strikemaster" trainer programs, and Saudi officials have discussed the Nimrod with the British government on at least three separate occasions. The likely British position on a Saudi Nimrod purchase was suggested by Prime Minister Thatcher during her April 1981 visit to Riyadh, where she declared that Britain would be happy to supply the kingdom with aircraft and other weapons, such as tanks.

The Nimrod AEW Mark 3 is the latest version of the basic Nimrod series of military aircraft in service with the U.K. since the 1960s. Britain is contributing 11 Nimrods to the NATO AEW&C program as its share of the overall NATO AWACS/Nimrod deployment effort. The first Nimrod Mark 3 has been delivered to the Royal Air Force and will enter service in 1982, and all 11 are expected to be delivered by 1985.

The development program has involved putting new radars, communications, and avionics in existing Nimrod

airframes. The Nimrod production line is closed down, and British Aerospace officials have stated that it would take a minimum export order of 6-8 Nimrod Mark 3s to make a restarting of the production line economically feasible. The first Nimrod probably could not be delivered to Saudi Arabia before 1986.

The Nimrod is fully automated in its radar detection and tracking capability. Using its down-link to a ground processor, the Nimrod can perform the warning function with no on-board operator intervention needed whatsoever. The on-board operators concentrate mainly on vectoring intercepts.

The Nimrod has similar range, speed and endurance characteristics to AWACS, but it normally cruises at 25,000 ft. (versus 30,000 for AWACS and 25,000 for the E-2C), thereby giving it a smaller radar horizon and a shorter low-level target detection range. Unlike the AWACS, the Nimrod has a "frequency agile" radar, which inhibits enemy jamming, and other electronic counter counter-measure (ECCM) equipment not intended to be provided Saudi Arabia.

The Nimrod has the same Passive Detection System as is on the E-2C, with the same capability to detect and identify electronic emitters on tanks and ground radar, regardless of whether the ground-based vehicle is moving. The Nimrod's pulse-doppler radar has been optimized for maritime operations, but will presumably have over-land capabilities comparable to that of AWACS and the E-2C. Unlike AWACS, the Nimrod will not have an aerial refueling capability. As shown on the attached chart, Nimrod has fewer weapons intercept consoles and hence less "battle management" capability.

Despite the potential promise of the Nimrod, the program remains developmental at this point. Some experts in the U.S. AEW&C community consider the Nimrod's radar configuration to be an unexplored approach and thus as of yet unproven. Unlike the AWACS and the E-2C, the Nimrod has not seen actual service in military operations, and thus a decision by Saudi Arabia to purchase the system would, for another year or two, entail certain risks.

3. Other Radar Systems

Besides the AWACS, the E-2c and the Nimrod, the only other airborne radar surveillance aircraft now flying are two models in the Soviet inventory: the modified TU-126 MOSS and the IL-76 CANDID. However, the Soviet Union has never exported any AEW&C aircraft to any country, including its closest allies, and a Saudi request to the Soviets for this technology would

be completely at odds with the strong anti-communist thrust of Saudi foreign policy.

Some commentators have suggested that the Saudis might employ picket ships in the Persian Gulf or tethered balloons to provide radar warning capabilities superior to ground-based radar units. However, radars mounted on picket ships possess the same low-altitude coverage limitations (20-30nm) as ground based radars and would be subject to similar ducting problems. To provide a continuous screen of radar coverage against 200' altitude targets, the Saudis would require scores of ships constantly on station in the Gulf, each of which would be vulnerable to low-level attack. Balloon-borne radars would be precluded in periods of high winds or adverse weather. Neither of these systems could be rapidly redeployed to other regions of the kingdom.

4. Summary

Although various alternatives to the AWACS are theoretically available to the Saudis, a Nimrod buy would appear to be the most likely choice, should the Kingdom give up its efforts to obtain the AWACS. If one assumes that the Nimrod development program will succeed in meeting British and NATO requirements and that the British could support Saudi manpower, training and logistics needs, then the Nimrod would be fully capable of performing the air defense mission envisioned for the AWACS. Its time-on-station, radar detection, and communications capabilities are comparable to AWACS and well suited for providing early warning of low-level air attack across the Persian Gulf.

In certain key respects, though, an acquisition of the Nimrod by Saudi Arabia might be regarded by Israel as more threatening than would be the case with the AWACS. The Nimrod's frequency agile radar would be significantly more difficult to jam than is the case with AWACS. The Nimrod carries very sophisticated passive electronic detection equipment that enables it to detect and track aircraft, armored vehicles and ships by means other than radar. And perhaps most significantly, Israel could not rely upon the British to attach any strings to a Nimrod sale or to be as inclined to "pull the plug" on the system should Saudi Arabia employ the Nimrod against Israel in peace or war. On the other hand, Israel might well feel far less inhibited in attacking the Nimrod, in the air or on the ground, than would be the case with the U.S.-supported AWACS.

IV. MILITARY IMPLICATIONS OF THE PROPOSED SALES FOR ISRAEL

There has been a great deal of confusion in recent months about the capabilities and limitations of AWACS and the F-15 enhancement package. The confusion resulted in part from the lateness of United States consultation with the Israeli military about details of the sale. Israeli military officials flew the AWACS and were briefed about the details of the sale for the first time late in August 1981. The late consultations came after some Israeli officials and military writers publicly stated their concerns about the system's capabilities for ground surveillance, electronic eavesdropping and photographic intelligence -- capabilities that AWACS does not have. Some of the misstatements apparently occurred because Israelis extrapolated from their experience with the E-2C Hawkeye, a system which can detect and track weapons systems by means other than radar. In addition, Saudi and other supporters of the package erred in the opposite direction by calling the AWACS and F-15 enhancement capabilities purely defensive. A detailed description of this equipment's capabilities can be found in the appendix. This section analyzes the impact of those capabilities on the security of Israel.

A. Capabilities of the U.S. AWACS and AIM-9L

An air force armed with AWACS gains a limited capability for enhancing offensive action. However, the extent of its usefulness in support of offensive operations depends on the capabilities of the air crews, the tactical air environment, the equipment provided with the AWACS, the intentions of the countries involved, and the extent of training performed in advance.

The U.S. AWACS is capable of directing combat engagements between fighters at a distance of about 200 miles. During the staff's visit aboard an AWACS, a mission commander demonstrated how he might direct a mock raid of U.S. fighters into enemy territory. On such a raid, the AWACS could vector its fighters around known enemy surface-to-air missile positions and provide the location of enemy fighter patrols. It could vector allied fighters to intercept enemy aircraft attacking the offensive strike formation. When equipped with radio transponders, friendly units could automatically provide their locations on the ground, and locations of opposing units could be reported and displayed visually on AWACS scopes. Such steps would be of value

to battle managers on the ground or on the AWACS itself, depending on the degree to which battle control was performed by commanders on the AWACS.

Refueling tankers would give AWACS more time on station and attacking F-15s more time over the target. With AIM-9L all aspect missiles, F-15 pilots would enhance their capability to shoot down defending aircraft, and the conformal fuel tanks would also increase their loiter time over or near enemy territory.

The AWACS' capability to multiply the effective force of allied aircraft has been demonstrated at U.S. exercises such as Red Flag and AIMVAL/ACEVAL. At Red Flag, AWACS successfully assisted 134 friendly aircraft against 274 "enemy" aircraft. The mission commander of the AWACS we visited estimated that a U.S. AWACS crew can potentially increase the effectiveness of the fighters it manages by about 50%. Red Flag also showed, however, that AWACS is more effective when used to defend territory because of the impracticality of accompanying attacking fighters over enemy airspace and the limited number of weapons controllers aboard AWACS. The AIMVAL/ACEVAL tests concluded that the AIM-9L "has revolutionary capabilities" resulting in fundamental changes in air-to-air battle tactics.

Nevertheless, the possible degradation of the AWACS offensive capabilities can be significant if changes are made in assumptions about crew experience and training, enemy jamming, AWACS proximity to hostile aircraft, and the type of equipment aboard.

E. The Arab-Israeli Air Balance

Table 2 summarizes the Arab-Israeli air balance in 1973, 1980, and 1985. A two-front war during the next five years would yield a force balance ratio against Israel roughly equivalent to that of the 1973 war. If the Peace Treaty with Egypt is sustained, however, and Israel faces hostile forces on only the eastern front, the estimated quantitative force balance would be almost one-third less disadvantageous for Israel than it was in the 1973 war, a war in which Israel demonstrated overwhelming air superiority, although it suffered heavy losses from Soviet-built SAMS. Therefore, by far the most significant factor in any air balance evaluation of this region is whether peace with Egypt will be maintained.

Table 2

Estimated Arab Fighters Facing Israel 1973 - 1985 1/

	1973	1980		1985	
Front Line Forces		One Front	Two Fronts	One Front	Two Fronts
Egypt	600	0	550	0	500
Syria	350	600	600	700	700
Jordan	55	100	100	140	140
Expeditionary Forces 2					
Iraq	100	150	150	150	150
Saudi Arabia	0	0	0	40	40
Libya 3	0	50	75	75	100
Other	0	15	60	40	125
Total Arab	1105	915	1535	1155	1755
Israel	400	600	600	650	650
Ratio	1:2.8	1:1.5	1:2.6	1:1.8	1:2.7

1 Estimates made by Committee staff based on various official and non-government documents. Most estimates are rounded. Excludes trainers.
2 Only that portion of each force expected to be sent against Israel is counted in this force balance. Israeli planners tend to count all aircraft owned by expeditionary force countries.
3 Limit set according to pilot availability.

Israel has been able to maintain a considerable edge over its Arab neighbors in the air balance despite these quantitative totals for several reasons. Israeli pilots are highly trained and considered the best in the Middle East. Their aircraft have the most efficient airframes and the latest avionics available. They are supported by electronic support measures and aerial surveillance provided by their E-2C aircraft. They have the best communications jamming in the Middle East. It is these qualities that have resulted in 15 Syrian MIGs being downed over Lebanon with no Israeli losses. Although Israel's defense problem is hampered by lack of depth, its air defense problem is made easier because,due to the country's small size, defense assets can be concentrated for maximum overlap. Israel has probably the most intensive air defense per acre in the world. Its air fields are extremely sophisticated with hardened facilities designed to withstand a surprise attack.

Israeli Air Force commanders to whom we spoke stressed that they see some of their advantages disappearing. The sophistication of Arab aircraft tend somewhat to offset Israel's lead in pilot proficiency. Syrian MIGs are now more advanced and have a range that allows them to fly over all of Israel as opposed to the MIG-17s used in previous wars that had range only as far as Haifa. Arab surface-to-air missile systems, especially the Syrian, are improving -- though in Iraq's case they were noticeably ineffective during the Osirak Reactor raid. And with the return of the Sinai, Israeli airfields are geographically more concentrated and have more aircraft per field. Warning times have been reduced.

The AWACS sale to Saudi Arabia is viewed by many Israelis in this broader context. They see it as symbolic of their loss of a technological lead. One Israeli general told us his real concern is not AWACS but the next sale after AWACS, and that he did not know where the process would end.

The impact of a Saudi AWACS itself on this force balance depends primarily upon how useful one believes the AWACS will be in enhancing the capabilities of a Pan-Arab force. If one were to assume that the AWACS fleet sold Saudi Arabia could effectively enhance an entire Pan-Arab force, then the air balance could shift against Israel. On the other hand, if one assumes that it could enhance only a Saudi force of, for example, about 40 high performance fighters, with little or no help provided by other Arab air forces, then the impact is much less severe. Most Israeli generals to whom we talked believe that the AWACS sale would not significantly shift the air balance against Israel but would force Israel to

allocate new air combat and electronic warfare resources against Saudi Arabia, thereby making Israeli preparedness more costly.

C. AWACS Usefulness in a Saudi Air Attack on Israel

The first scenario to be discussed concerns a potential Saudi use of AWACS against Israel in control of about two squadrons of Saudi fighters and fighter bombers. The AWACS would guide about 40 F-15s and F-5s on missions against targets such as airfields or the port of Eilat, leaving the remainder of the Saudi air force to defend the Kingdom. The targets could be coordinated with other Arab states in advance, but in this scenario AWACS would not likely be used to guide other Arab aircraft. The air crews and pilots presumably would be well-trained in AWACS tactics and the AWACS and F-15s could use interoperable secure voice communications and compatible Identification Friend or Foe (IFF) systems. Under these circumstances, U.S. experts say some Saudi fighter bombers could likely reach their targets, but the losses of Saudi planes would be great, though damage would be done to targets in Israel.

To achieve even this limited result, though, the RSAF strike force would have to overcome a number of technical and operational problems, including:

-- The Saudi AWACS would not contain much of the equipment particularly useful for offensive operations. For example, it has no passive detection Electronic Support Measures (ESM)

The Saudi AWACS also contains only three battle management positions and will not have the additional three that are being added to new U.S. AWACS to enhance attack capabilities. With only three battle management positions and only voice communications to friendly aircraft, one Saudi AWACS could manage close intercept engagements for only six to eight Saudi interceptors. On average, a trained U.S. AWACS weapons controller can only handle one close-in fighter engagement at a time. Exceptional controllers can handle two or perhaps three different intercepts at a time. With even two Saudi AWACS on station in such an operation, then, less than half the attacking Saudi force could be provided individually controlled intercept assistance.

-- Although Saudi air-to-air communications would be secure, they would not be jam proof. There are currently no plans to sell new U.S. anti-jamming communications services such as "HAVE QUICK" or the more sophisticated JTIDS. All air-to-air communications would be by voice. [redacted] b-1 a5

-- Some U.S. industry sources interviewed by staff also believe that Israel has the capability at present to jam the AWACS radar. Since the AWACS radar is not "frequency agile", Israel could use its MN-53 electronic warfare system developed originally by the Elbit Company for the Israeli Navy, to intercept and identify the RSAF AWACS radar frequency. At this point, even a low-power jammer, set on the AWACS radar frequency, could "penetrate" the AWACS' main radar beam, effectively blocking one degree of the AWACS scan. Assuming the AWACS orbits 180 miles from Israeli airspace, Israel could establish a continuous screen of radar jamming by deploying low-power "noise" jammers every three miles along whatever sector it wished to cover. Such equipment is produced by AEL, Israel, Ltd.

-- The Israeli E-2C would be available to assist Israeli interceptors to compensate for support provided Saudi fighters by AWACS. Any adjustments in flight patterns made by Saudi aircraft to avoid Israel defenders could be quickly observed and countered by the Israeli E-2C. Using its ESM equipment, the Israeli E-2C could detect the Saudi AWACS [redacted] and vector scrambled Israeli F-15s to an intercept. Even if the attacking Israeli fighters did not shoot down the AWACS, they could force it to turn and run, thus removing it as a factor in the air engagement. NATO AWACS are instructed to stay [redacted] behind the FEBA (forward edge of the battle area) during time of war. b-1 a5 b-1 a5

-- The AWACS on an offensive mission would not have the capability to guide fighter-bombers against mobile ground targets (such as tank formations) but would be able to vector the interceptor escorts for air battles. If the F-15s do not get multiple ejection bomb racks (MERs), their payload carrying capability would be limited to three 2,000-pound bombs per plane.

-- A sustained Saudi attack on Israel would result in the loss of a good part of the attacking fleet. This would seriously degrade Saudi Arabia's ability to defend itself against Israeli retaliatory attacks. Its remaining Air Force would be vulnerable to annihilation. Expensive new development projects such as the Saudi military cities, the multibillion dollar industrial complex at Jubail, and the $15 billion gas recovery plants near the Persian Gulf could easily be struck by Israeli aircraft. As one senior Saudi official stated, "such an attack against Israel would be suicide for us, and our history shows that we are not suicidal". Indeed, Saudi Arabia has played only a very limited military role during previous Middle East wars.

-- Saudi reliance upon the United States for maintenance and resupply of the Saudi Air Force would be a powerful deterrent to any attack on Israel. With several thousand U.S. military advisors working with the Saudi Air Force, the Saudis could not be sure that its preparations for such an attack would not go unnoticed. If an attack were, nonetheless, carried out, the Saudi Air Force would run the risk of grinding to a halt within days if U.S. maintenance and spares were halted.

From a military point of view, then, the costs and problems involved in a Saudi air attack on Israel are so great and the possible rewards so few that the "Saudi-only" scenario does not seem likely.

The fact that Saudi Arabia has an enhanced capability, however, could place it under greater political pressure from fellow Arab states to participate in any military action against Israel. Israeli military planners feel that the United States should not contribute to increasing such a risk. Even a limited Saudi capability to damage Israeli airfields or the port of Eilat requires Israel to consider Saudi Arabia a confrontation state for any next war. According to one Israeli military analyst, "the Saudis will be in the next war". At a minimum, Israeli planners would have to

divert air assets now dedicated for other purposes to protect against a Saudi attack. In the worst case, they could include Saudi Arabia in any preemptive airstrike against confrontation states in order to avoid the difficult situation that they found themselves in during the 1973 war.

D. AWACS Usefulness in Directing a Pan-Arab Attack

A more significant threat to Israel would theoretically be AWACS supporting a Pan-Arab air attack on Israeli air bases. The problems facing such an effort would, however, be more complicated than those described above. In addition to the problems discussed for that scenario, a Pan-Arab attack coordinated by AWACS battle management capability would have to overcome problems of training and interoperability. Unless these problems satisfactorily solved, the use of AWACS to coordinate such an attack could easily prove counterproductive.

The first problem that would have to be overcome is training. Several weeks of training would be required to allow skilled AWACS crew members to work efficiently with pilots of allied Arab countries. The Commander of the Israeli Air Force told us that the other Arab air forces would have to exercise with the Saudi AWACS in advance if the combined force were to be effective in war. Tactical procedures would need to be developed, the AWACS "language" would have to be learned, and mutual trust would have to be gained.

U.S. experience with Red Flag exercises indicates that it takes ten days to two weeks to teach U.S. Air Force AWACS crews and USAF fighter pilots to work at peak efficiency. U.S. Air Force and Navy crews working together requires even more joint training, as do NATO crews.

If less efficiency is considered adequate, however, less training can still produce some results. For example, recently U.S. AWACS crews did successfully vector four Egyptian MIGs after minimum training by using voice communication. Voice communications would be complicated, however, since Saudi pilots generally use English for the technical terminology while Syrian pilots do not. U.S. Administration officials believe that because AWACS maintenance technicians will be American, extensive Saudi training of Syrian or Jordanian pilots would likely be detected.

The second and more difficult problem that would need to be solved is equipment interoperability. For example, Soviet MIGs generally use VHF frequencies while most standard AWACS radios are UHF and HF. Installation of extra VHF radios on the RSAF AWACS would be detected and, according to DOD officials stopped. Saudi AWACS would speak to Saudi fighters over

U.S.-provided radio "scramblers" that would not be available to Syrian forces. Either Saudi AWACS would have to disadvantage its own air force by broadcasting in the clear or instructions would have to be sent first in code and then in the clear -- which would not be a timely procedure. As noted earlier, any voice communications sent in the clear could be intercepted and jammed. And IFF transmitters would have to be made interoperable so that Pan Arab forces could be distinguished from Israeli forces, assuming the Israeli fighters did not "mimic" RSAF IFF codes.

Even if these problems were overcome, AWACS itself could provide close control engagement support for only a limited number of Pan-Arab aircraft. If AWACS operators chose to provide only more general information to larger number of Syrian or Jordanian pilots, the main intercept control capability of the AWACS would be lost.

Difficulties relating to training, equipment interoperability, and dependence upon U.S. contractors suggest that any Saudi attempt to develop an ability to effectively coordinate a Pan-Arab air force would be difficult without U.S. cooperation or at best tolerance. Problems inherent in the scenario related to AWACS vulnerability, Israeli electronic countermeasures, limitations of the Saudi AWACS' equipment, terrain masking, crew limitations, and U.S.-Israeli retaliation all indicate that such an effort would have limited military value and would result in significant risks for Saudi Arabia.

E. Defensive Use of AWACS and F-15s

If the Saudis were to use their AWACS and fighter cover in a purely defensive mode while other Arab aircraft attacked elsewhere, Israel would nonetheless have to guard against the possiblity that the Saudi force might go over to the attack. Flying in orbits within their own border, for example on defensive combat air patrols (CAP), would be enough to tie down some Israeli F-15s. To maintain the option of defending against or chasing away the Saudi AWACS and the F-15s would require the Israelis to keep a fighter force concentrated on the Saudi sector. Use of the AWACS and the F-15s in this manner by the Saudis could affect the outcome of an Arab-Israeli air war marginally, but it would entail the risk of provoking an Israeli attack on Saudi forces.

SECRET

F. AWACS Downlink to Jordan and Syria

A third concern is that AWACS information would be transmitted on a real-time basis to air force commands in Jordan and Syria. The Saudi air force itself would not be engaged in hostilities or in direct control of Arab fighters, but would only provide information to Arab command centers, thus minimizing the risks of retaliation.

Ths Israelis note that there is already cooperation between Jordan, Syria and Saudi Arabia on air surveillance in areas between their countries. 6-1 a-5

AWACS data could, the Israelis fear, be interpreted as consistent with cooperation agreements.

The AWACS data could, in theory, be transferred to Jordan and Syria by verbal telephone communications, by television monitors, by AWACS Tadil B ground links or directly by the AWACS to Arab command centers via Tadil A downlinks. None of these four methods of transmitting information to Jordan and Syria would likely go unnoticed by the United States, though the U.S. would not necessarily challenge telephonic links between Saudi and Jordanian or Iraqi military installations. American officials say their value in a fast-moving air battle would be limited, but Israeli military leaders disagree. With the U.S. personnel involved in various aspects of the Saudi command, control, and communications system, any missing Tadil A or Tadil B equipment would also probably be noticed. At present, it is unlikely that the U.S. would sell Jordan or Iraq compatible AWACS datalink equipment.

Reliable real-time information provided to Jordan and Syria on all Israeli aircraft activities in time of war could prove useful to a Pan-Arab attack, for example, by alerting Arab fighters to the general location and direction of flights of Israeli fighter formations. There are, however, several limiting factors concerning this scenario. First, Administration officials say the Saudis have assured the United States that no AWACS data would be transferred to third countries. Second, as noted, useful real time data transmission devices would most likely be discovered by United States maintenance personnel and the Saudi AWACS program would be jeopardized. Also, data transmitted in this fashion would be reconnaissance data only. The AWACS' sophisticated battle management capabilities which make it a unique aircraft would remain unused.

G. AWACS Usefulness Against Israel in Peacetime

Several Israeli officials interviewed expressed concern about a Saudi AWACS' usefulness against Israel in peacetime or in times of tension short of war. [redacted] b-1 a3

They believe AWACS can gain new tactical intelligence by monitoring Israeli air exercises and flight training, that it could prevent successful Israeli actions against limited targets, and that it could provide early warning of a 1967-style Israeli preemptive strike against Arab targets.

The three computer generated maps on the following pages show what AWACS could see from various positions in Saudi Arabia. Flying at 29,000 feet north of Tabuk, near Eilat, AWACS could see all aircraft in the air in southern Israel (Map 5).

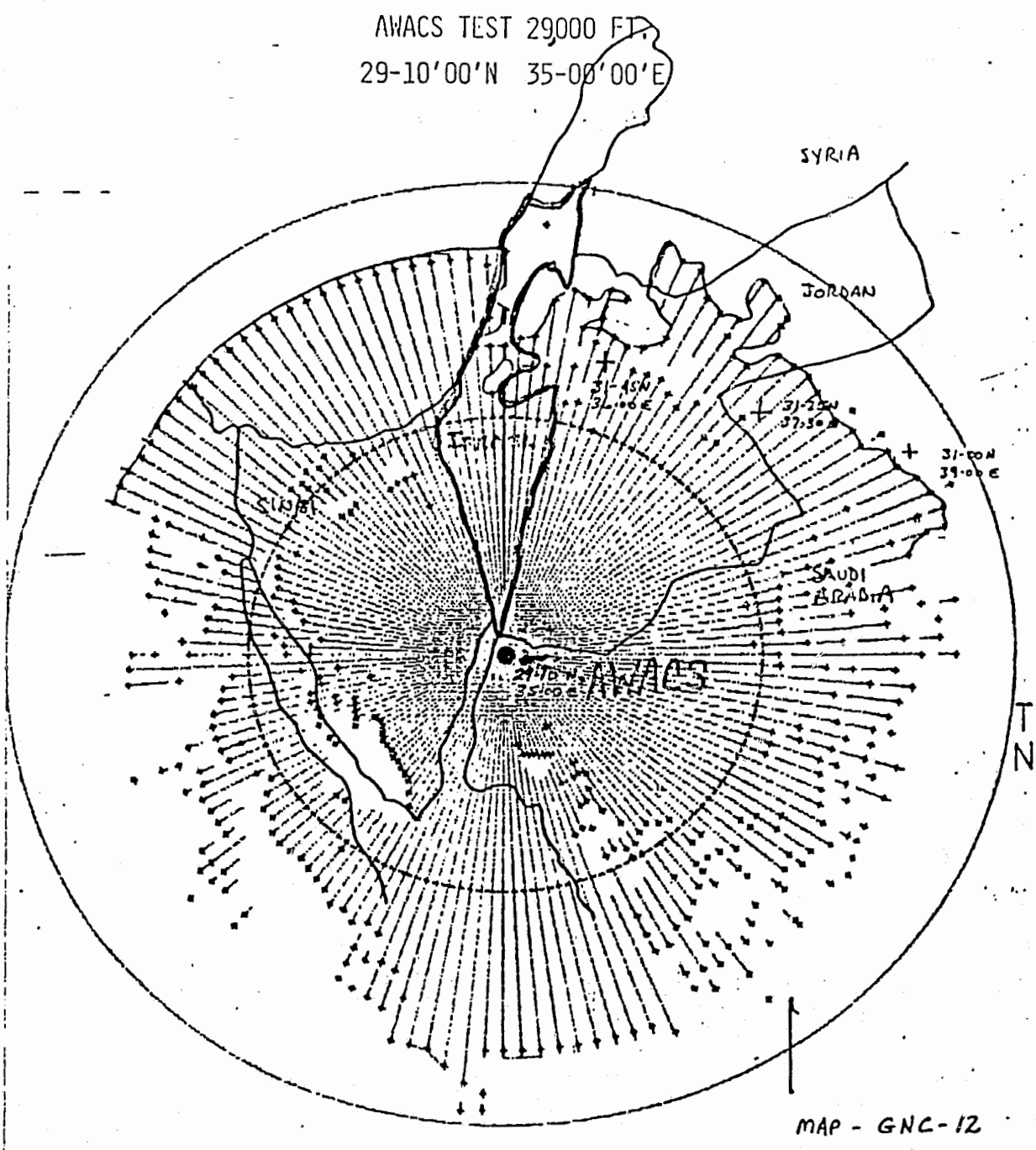
Flying at 29,000 feet near the Jordanian border in a more northern location (Map 6), AWACS could see more of northern Israel, but very low coverage of areas in the Negev and Tel Aviv would be masked by high mountain ridges in Jordan. If AWACS climbed to 40,000 feet at this location, this masking phenomenon would be reduced by about 30 percent, but due to fuel consumption, the AWACS mission would be much shorter. U.S. AWACS normally fly missions at 29,000 feet. If and AWACS is moved back to a less vulnerable position further within Saudi air space, more of Israel would be masked from AWACS view (see Map 7), even if the AWACS climbed to 31,000 feet.

There is a difference of opinion as to how much additional information Arab forces would gain from AWACS, even if they could see all ground-level Israeli aircraft activity. [redacted] b-1 a5

[redacted] Furthermore, the Syrian Air Force has probably learned a lot about Israeli air combat tactics by having witnessed 15 of its MIGs shot down in recent years, although tactics are always subject to change.

A Saudi AWACS could indeed be useful in providing some early warning of Israeli raids or preemptive attacks against Arab targets if it were in the area at that time. The time gained, however, would be no more than a few minutes as compared to Jordanian or Syrian radar. The AWACS would not be useful in assisting Syria with Israeli raids over Lebanon unless the AWACS moved North from Saudi air space.

Map 5



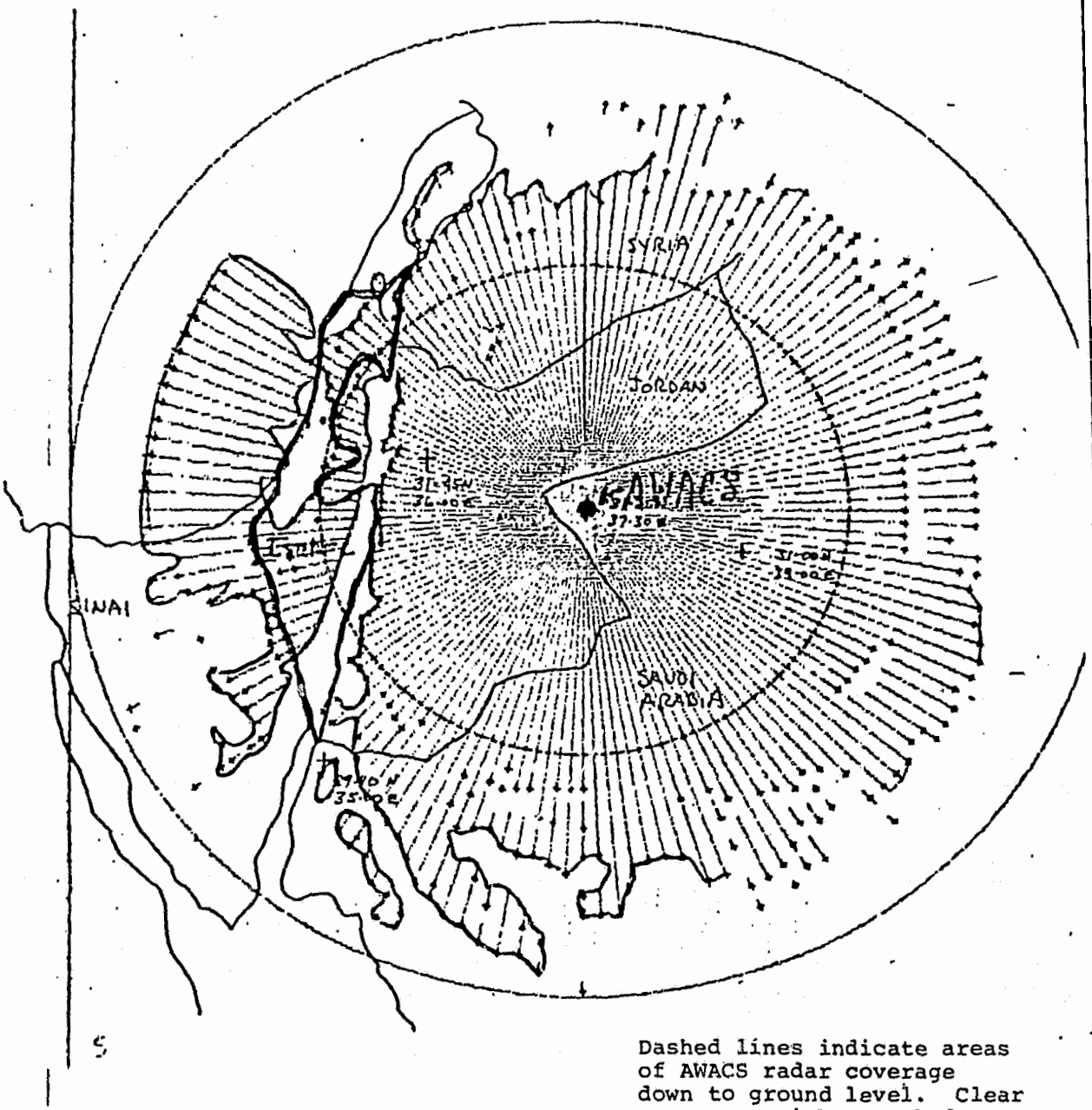
Dashed lines indicate areas of AWACS radar coverage down to ground level. Clear areas are either masked or beyond the AWACS radar horizon.

SOURCE: Department of Defense

AWACS AT 29000 FT

31-25'00'N 37-30'00'E

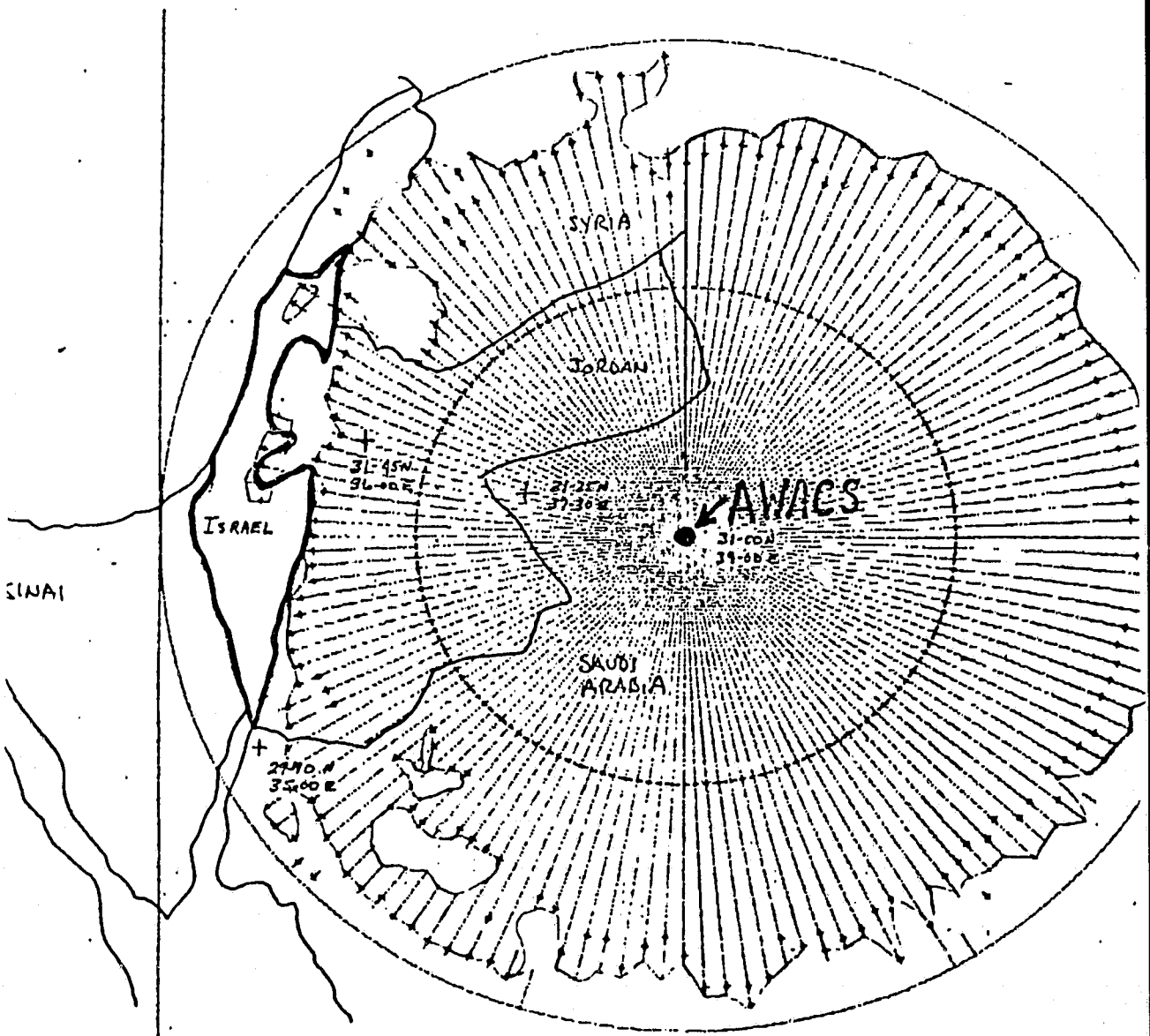
Map 6



Dashed lines indicate areas of AWACS radar coverage down to ground level. Clear areas are either masked or beyond the AWACS radar horizon.

SOURCE: Department of Defense

AWACS AT 31000FT.
31-00'N 39-00'E

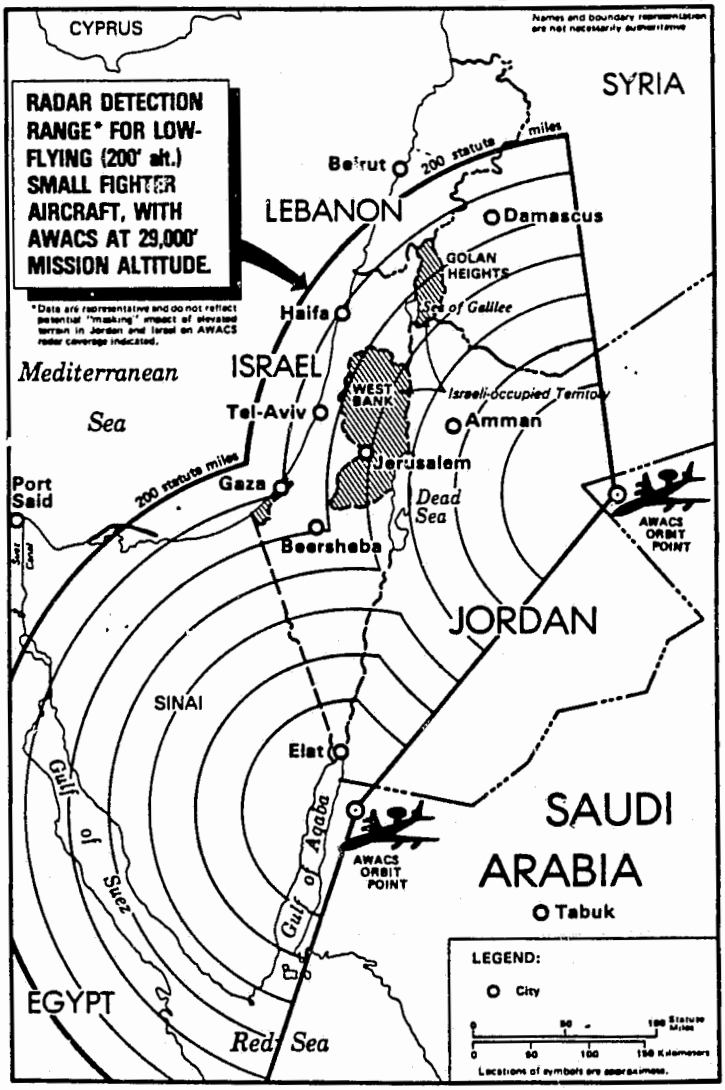


SOURCE: Department of Defense

Dashed lines indicate areas of AWACS radar coverage down to 200 feet altitude. Clear areas are either masked or beyond the AWACS radar horizon.

MAP 8

Saudi AWACS Radar Coverage of Israel



Map prepared by Congressional Research Service

The important factor in AWACS use against such Israeli raids is time on station. Using ground-based ESM equipment or an airborne E-2C, Israel could detect whenever AWACS was in the vicinity on a random flight, so to provide uninterrupted early warning with only five AWACS, 24-hour coverage of Israel could be sustained for only short periods of time. As the Osirak raid demonstrated, one AWACS on orbit cannot provide simultaneous radar coverage of Israel and the Persian Gulf.

H. Summary

An air force armed with AWACS does gain a limited capability for enhancing offensive action. But in the case of Saudi Arabia, there are significant costs and problems involved in any scenario in which the AWACS is used against Israel. As a result, a Saudi AWACS would not significantly alter the current Arab-Israeli air balance.

Maximum efficiency would probably be gained from an attack in which Saudi fighters alone were guided by AWACS as part of a closely coordinated Pan-Arab attack. The effectiveness of such an attack would be limited, however, by AWACS equipment limitations, Israeli jamming and E-2C capabilities, terrain masking, AWACS vunerability, and possible early warning from U.S. maintenance personnel. The costs for Saudi Arabia could be severe in terms of Israeli military retaliation and severed military ties with the United States.

A second scenario in which AWACS battle management functions are used to direct a Pan-Arab attack is less credible because of additional severe problems relating to crew training, equipment interoperability, battle management limitations, and detection by U.S. maintenance personnel.

A third scenario in which a Saudi AWACS would provide a radar scope data link with Jordanian and Syrian command centers is more credible, but real-time data link equipment would probably be discovered by U.S. personnel. In addition, provision

of AWACS radar information only would minimize the effective use of AWACS offensive capabilities and provide frontline Arab states with only slightly better information than that available from mountain-top ground-based radar stations.

A fourth scenario could involve defensive use of the Saudi AWACS, probably with an F-15 fighter cover, flying orbits inside the Saudi border while other Arab planes attacked Israel from other directions. Such an operation would offer benefits to the Saudis while entailing many risks, but it might appear to them to be the most attractive option if they decide they have to make at least a token military contribution to an air war.

In peace time, AWACS, might provide Arab states with new intelligence information on Israeli air combat tactics, but at the price of abandoning AWACS orbits near the Persian Gulf for near round-the-clock surveillance of Israel.

Despite the technical and political problems inherent in each scenario, Saudi Arabian ownership of AWACS and a long-range F-15 capability would place it under significant Pan-Arab political pressure to use its new capabilities in time of war. Under these circumstances, Israeli Air Force personnel are forced to develop worst-case scenarios that can complicate their defense planning and might bring Saudi Arabia into any next Middle East war against its will.

V. ADDITIONAL CONSIDERATIONS

A. Political Implications for Israel of the Sale

There are important symbolic and political -- as well as military -- aspects to the AWACS and F-15 enhancement sales which disturb many Israelis. By way of putting the matter in context, however, they say their concern over the sale's political implications are related to their military worries.

The Israelis tend to view their foreign policy and political relationships as vitally linked to their military security defined as the ability to maintain a deterrent strength to discourage another surprise attack on them, such as the 1973 Yom Kippur War and, if necessary, the capability to win a war while minimizing the number of Israeli casualties.

In discussing the proposed sale of AWACS and F-15 enhancement equipment, Israeli analysts both in and out of government are concerned that the overall balance of power is tipping against them because of economic and political factors. These factors include the Arabs' oil leverage, which translates into the ability to purchase the latest in Western military technology and to hire foreign technicians to help maintain the sophisticated equipment.

Israeli attitudes are also affected by their sense of history of arms sales and conflicts in the Middle East. Maintaining a military edge over the numerically superior Arabs has been a constant problem for Israeli planners, dating back to the nation's founding in 1948.

The Israelis see the 1978 F-15 sale and the proposed AWACS and F-15 enhancement sale -- now being pressed despite the 1978 assurances -- as a further erosion of their relationship with the U.S. Some Israelis question now whether the U.S. remains willing to help her keep a sufficient edge over the Arab forces.

As viewed by some Israelis the sales indicate that the U.S. is joining such countries as France in a willingness to sell the Saudis whatever they want, no matter how much it might eventually hurt Israel. This perception appears to underlie much of the political and psychological reaction against the sale of the new technology.

To some extent, this perception had been countered in the past by allowing Israel to buy additional military equipment to keep up with the Arabs' acquisitions. In March, the Israelis indicated they would reluctantly go along with the F-15 enhancement package because they did not want to get into a major dispute with the new administration. They also were offered loans to buy additional F-15s to offset the enhanced Saudi F-15s. Although the Israelis were less than enthusiastic, they appeared willing to mute their opposition to the Saudi F-15 package.

The Administration decision to expand the package to include AWACS took the Israelis by surprise, since the earlier impression had been that an airborne warning system for the Saudis was only going to to be under study. This added to the perception that the AWACS sale is another sign the U.S. is tilting toward the Arabs. Israel now has been joined by Egypt (which is receiving F-16s) and Saudi Arabia in having access to the latest model U.S. military hardware.

One experienced diplomat describes the political and psychological dimensions of the sale as a "rejected lover syndrome". While some Israelis naturally disagreed with that characterization, there seems to be a general feeling that repudiation of the 1978 assurances on the F-15 enhancement does not enhance confidence in American reliability. This, in turn, as suggested by an official close to the ruling Likud party, may make it even more difficult to obtain concessions from Prime Minister Begin during peace talks on matters he feels affect Israel's security.

There also are economic implications to the sale, say Israeli officials. Earlier this year, the Reagan Administration offered to let Israel borrow up to $600 million to buy an additional dozen F-15s to help counter the enhanced Saudi Air Force. Israel previously bought 45 F-16s and had permission bo buy more but did not take up the option because of the cost. The proposed FMS loan would cost Israel an estimated $120 million annually in finance charges. In effect, said one Israeli economic official, Israel would then be paying in order for the U.S. to indulge in the latest new weapons they want, whether needed or not. Thus, he said, Israel would be paying a financial as well as a political and economic price for the latest Saudi arms sales.

Past Saudi pronouncements on the possible use of military equipment against Israel represent another focus of Israel's political response to the proposed AWACS/F-15 enhancement sale. Most worrysome has been a series of calls for a Jihad or "Holy War" against Israel. Last October, Saudi Foreign Minister Saud al Fayasal said a Jihad against Israel sought to preserve "the violated holy places." A Jihad, he said, "emanates from self-sacrifice and seeks to use all spiritual, cultural, political, material and military resources . . . in order to save Jerusalem from the grip of racist Zionism."

American officials in Saudi Arabia say the Saudis have been somewhat embarrassed by adverse reaction in the U.S. to such statements. In a recent meeting, a senior Foreign Ministry official took pains to emphasize that the concept of Jihad was misunderstood in the West. He said it was a comprehensive concept which includes strengthening one's own attitudes and negotiating from strength.

There does appear to be a consensus in the diplomatic and foreign military community in Saudi Arabia that in the event of another Arab-Israeli conflict, the Saudis will have to "do something", but there is no agreement on exactly what the Saudis might do.

B. Saudi Political Stability

Two years ago, in the wake of the Shah of Iran's fall, the Mecca incident and riots in the oil-rich Eastern province, concerns were voiced about the stability of the Al Saud ruling family in Saudi Arabia. Nevertheless, U.S. officials and many foreign observers in Saudi Arabia are confident that the Saudi government has weathered the shocks of the past two years and learned some important lessons, though there is continuing concern over long-term trends and possible developments during the coming decade. It is during this time frame that the Saudis are expected to be mastering the operations and maintenance of their sophisticated military equipment such as the F-15 jet fighter planes and possibly the AWACS.

Those in the U.S. government who follow the state of Saudi stability say they find it in good shape. Indeed, as stated in the "talking points" prepared by the State Department for briefing members of Congress on AWACS and F-15 enhancement package, the Administration regards Saudi Arabia as "one of the most stable Arab states". The paper adds that "concern about Saudi stability is more a reflection of regional developments and the increasing importance of Saudi Arabia and the West rather than any domestic development within the Kingdom".

Nonetheless, two major events within Saudi Arabia provided a rude shock to the Kingdom and the Moslem world. From a psychological viewpoint, the most disturbing event was the seizure of the Grand Mosque in Mecca on November 20, 1979, by a group of about 500 armed men. The attack involved fundamentalist Saudis Muslims who felt that the Saudi government--despite the traditionalist and conservative images it enjoys elsewhere--failed to vigorously maintain the tenets of Islam. Some of the participants were non-Saudi Muslims and there were unconfirmed press reports that some of the raiders had received training in a terrorist camp run in South Yemen by a wing of the PLO, the Popular Front for the Liberation of Palestine.

Other events which broke out on the same day posed the threat of serious economic disruption. The minority Shi'ite community in the oil-rich Eastern province has been increasingly restless, their economic and social grievances no doubt aggravated by the propoganda broadcasts across the Gulf from their co-religionists in Iran who had staged a successful revolution against the Shah earlier that year. At least five persons were reported killed in clashes with Saudi National Guardsmen during a Shi'ite religious holiday and a day of high emotion. Additional outbreaks of violence with casualties were reported in January and February, 1980.

One of the difficulties in assessing the situation within Saudi Arabia is the relatively closed nature of the society

to foreigners. In addition, U.S. officials are sensitive about adverse Saudi reaction to negative or pessimistic reports about their internal situation. Last year, the Saudis were extremely upset about press reports that there were difficulties within the Royal Family and that a CIA study suggested the regime's survival could not be assured beyond the next two years. [illegible]

In the course of our staff investigation, the following views were often expressed by U.S. and other diplomats:

-- The Saudi government currently is basically stable, and it is erroneous to make comparisons with Iran, where the Shah was at odds with religious leaders, and the economic inequities and strains were much greater.

-- The Saudi Royal Family does keep in touch with the people, not only through the tradition of Majlis, in which ordinary citizens can present their grievances to members of the family and lower ranking officials, but also through the web of family, personal and tribal connections. Thus, the regime is unlikely to become as isolated as the Shah or some other rulers who are non-democratic in the western sense.

-- In the wake of the 1979 Mosque and Eastern province incidents, the Saudi government has taken steps to recoup its position. It replaced some National Guard and civilian officials in both the Mecca and Eastern regions. The government also announced plans to establish a Consultative Assembly and adopt codes of conduct aimed at curbing corruption and ostentatious living.

-- The government is showing more sensitivity to the problems and complaints of the Shi'ite minority of about 200,000 in the Eastern province. They have been the subject of discrimination for centuries. The Shi'ites compromise about half of Aramco's labor force in the oil facilities of the Eastern province. Because of their situation and sense of grievances, they are regarded as a potential security problem. Their skills are essential to the oil operations. However, the government is taking steps to improve the economic situation in the region and has met with local leaders to discuss economic and other grievances.

-- The government also is handling carefully and cautiously problems of bringing the nation into the 20th century with an extensive modernization program while, at the same time, attempting to retain traditional religious and family values. The continued barriers against Saudi women working outside a few select fields, such as nursing or teaching, and the strict codes of public

behavior, reflect this effort to avoid upsetting the traditionalists by going too fast and far with modernization.

So far, the royal family apparently has shown a remarkable degree of cohesion despite its size. From time to time, there are differences of views and emphasis among the many sons and grandsons of Abd Al-Aziz Ibn Saud, the desert warrior who established the Kingdom in 1932. The emphasis on working out a consensus has helped soothe over differences and has maintained the outward unity of the ruling family.

At the present time, there is no significant focused political opposition with the Kingdom. There are one or more small splinter radical groups operating in Beirut and elsewhere overseas, but so far they appear to be fragmented and without impact. There is no free press, labor unions, or other institutions which could be a focal point of dissent within the Kingdom.

Nevertheless, a number of concerns have been raised about future trends in Saudi society. They include:

-- Saudi Arabia may face difficulties in satisfying political and social desires of thousands of western-educated young people as they return home and move into otherwise satisfactory and remunerative positions.

-- The military may also suffer from frustrations, despite good pay and fringe benefits, if upward advancement is slow.

-- The image of ostentatious living has prompted concerns about a reaction from religious traditionalists.

-- There also are long-range concerns about the impact of foreigners. They include about one million Yemenis, primarily doing manual and unskilled work, and about 100,000 Palestinians, mainly in professional jobs. The Saudis continue to be nervous about the large influx of pilgrims for the annual Haj, or pilgrimage to Mecca. Some of the participants in the 1979 uprising entered the country as pilgrims.

C. Understandings Related to the Sale

The Administration has announced that it has developed understandings with Saudi Arabia related to:

-- The transfer to third countries of AWACS equipment and data;

-- Exchange of mutually beneficial defense information;

-- Stringent security for the protection of AWACS; and

-- The geographic area in which the Saudi AWACS will operate.

As of this writing, the staff has not been privy to or briefed on the details of these understandings and hence cannot assess their adequacy in addressing various concerns about the proposed sales.

D. Security of AWACS and AIM-9L Technology

Under the proposed sale, Saudi Arabia would buy five "standard" AWACS with several items of sensitive equipment removed. The standard AWACS is an upgraded version of the "core" AWACS. The first 23 USAF AWACS were core models. The standard has the following improvements over the core model: improved computers with four times the memory capacity, maritime surveillance capability, and greater communication capability. The Saudi standard AWACS reportedly will not contain the following equipment due to its sensitive nature:

-- U.S. encipherment gear,

-- The Joint Tactical Information Distribution System (JTIDS),

-- HAVE QUICK and SEEK TALK anti-jamming devices,

-- Other ECCM Enhancements,

-- Mode 4 of the Identification Friend or Foe (IFF) system,

-- Tadil C encrypted air-to-air data links,

-- Computer data related to U.S. battle tactics.

Other equipment may also be removed, since as of August 1981, the U.S. National Disclosure Policy Committee had not finished its review of the proposed sale.

The standard Saudi AWACS will still contain information which could be very valuable to the Soviets if compromised, and stringent security measures would be required. Capture of or access to a U.S. AWACS reportedly remains high on the list of Soviet intelligence targets. The usefulness of AWACS technology to the Soviets falls into two general categories: information gained through reverse-engineering that could improve the Soviet airborne eary warning system and information that could counter U.S. AWACS operations.

The Soviet Union has already gained a substantial amount of information on AWACS by monitoring operational flights and by reading publications such as Janes' All the World's Aircraft and Aviation Week.

None of this, of course, substitutes for a first-hand look at the aircraft itself.

The Soviets have designed two versions of their own airborne early warning aircraft: the first, with the NATO code name "Moss", has been operational for several years, but has very limited capabilities. A newer generation is under development and is based on the wide-body transport called the IL-76 CANDID.

It is unclear whether the CANDID has AWACS' battle-management capability, its maritime capability, its small radar beam side lobes which reduce ground clutter, its ability to determine aircraft altitudes, or its ability rapidly to analyze and transmit data.

Since their CANDID is similar to AWACS technology, information gained through reverse engineering could be readily adaptable. Soviet gains might come from AWACS' radar technology, its fourth generation computer, and its software. The radar technology is now 11 years old, but is still considered superior to Soviet technology. They have dedicated considerable efforts to reverse engineering Western microelectronic components, but Administration officials note that similar computers may be available commercially.

Saudi AWACS will not be delivered until early 1986. If compromised immediately after delivery, the Soviets could use the technology in their CANDID by the end of the decade. The radar technology would then be more than 20 years old, but it could still prove useful to the Soviets if they were willing to redesign existing aircraft. It is likely, however, that by then the Soviets will have improved the CANDID's technology to a point more advanced than that represented by the Saudi AWACS.

A second concern is that loss of a Saudi AWACS would help the Soviets design jamming systems to defeat U.S. AWACS. According to industry sources, loss of an AWACS would give the Soivets access to signal processing techniques and unique ECCM features which cannot be determined by external observations. Such knowledge might lead to Soviet "smart-jamming"

techniques.

Industry sources further state that "certain features of the AWACS logic system could be modified to alter system parameters and avoid degradation." Other advanced features are also available to counter any Soviet smart jamming capabilities. It appears, therefore, any Soviet gains in the area of radar jamming would be costly for them and countered by U.S. technology.

The Administration intends to develop security arrangements for the Saudi AWACS that are far in excess of normal safeguard procedures. For example, a General Security of Information Agreement is being developed to provide procedures for access to classified information, periodic inspections, and physical security. There will be a special U.S. security officer assigned to the U.S. Military Training Mission (USMTM) in Riyadh. There will be strict prohibitions on the transfer of AWACS technology to other countries. A special security plan will be developed by a U.S.-Saudi team and approved by the U.S. government one year prior to delivery of the first AWACS. In general, physical security at Saudi Air Force bases is considered by USMTM personnel to be fairly good.

Plans for physical security of the aircraft and its manuals cannot, however, prevent a crew from defecting with AWACS while on a normal surveillance orbit; nor can they provide for security of the aircraft if a radical faction takes over the government in Riyadh. A senior Saudi official, when asked to comment on these concerns stated "if there should be a dramatic shift of power in Riyadh, the West would lose a lot more than AWACS technology."

The AIM-9L presents a more serious danger of technology compromise because of its advanced seeker and fuze technology. The seeker and fuze technology allows this version of the Sidewinder missile to be fired at enemy aircraft from any angle, rather than only from the rear. While the Soviets are aware of the basic cooling technology involved, they do not yet have the manufacturing capability to produce a comparable all-aspect missile.

AIM-9L technology has thus far been limited to NATO countries, Japan, Australia, New Zealand, and Israel. It is being coproduced with several NATO countries, but the fuzes are all produced in the

United States and guidance and control systems (seekers) are being coproduced only with West Germany. The United States recently decided not to sell the AIM-9L to Sweden because of concerns over security of technology. The physical security of the AIM-9L would be difficult to control, because 1,177 missiles would eventually be stored in several locations. If the missiles are sold to Saudi Arabia, very stringent sec ity procedures would need to be developed specifically for the AIM9-L.

E. Interoperability and Data Sharing

There are two sides to the "data sharing" coin: (1) cooperative arrangements between the U.S. and Saudi Arabia to ensure that defense information of mutual interest is shared in peacetime and to facilitate interoperability of Saudi and U.S. AWACS aircraft in times of tension or hostilities; and (2) firm understandings between the two countries, to include perhaps some technical limitations or restrictions, to guarantee that defense information gathered by the AWACS is not shared with other Arab states.

(1) Joint U.S./Saudi AWACS Operations

The communications features of the Saudi AWACS will be identical to the U.S. "standard" AWACS model, with the following exceptions:

-- The Saudis AWACS will not have the Joint Tactical Information Distribution Systems (JTIDS).

-- The Saudi AWACS will not have the HAVE QUICK anti-voice jamming improvement.

-- In lieu of the U.S. "military" Mode IV Identification Friend or Foe (IFF) cryptographic equipment, the Saudis will be sold U.S. Government-controlled and sanitized "commercial"-type IFF Mode IV cryptographic equipment. The Saudi IFF for Modes I-III will be the same as on the U.S. AWACS.

-- In lieu of the U.S. "military" encrypted communications gear KG-40, the Saudis will be sold a sanitized, U.S. Government-controlled "commercial"-type crypto equivalent for secure data links.

-- The Saudis will be sold a sanitized, U.S. Government-controlled "commercial"-type secure voice system for radio communications with the RSAF F-15s.

-- The Saudis will not be provided the computer software needed for TADIL C data links with U.S. Air Force F-106 interceptors or U.S. Navy F-14 fighters;

Even with no modifications to Saudi and U.S. AWACS and F-15s, the two air forces still would have substantial communications interoperability capabilities.

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The RSAF AWACS communications equivalent equipment is being designed for "form, fit, and function" interchangeability with counterpart U.S. AWACS equipment. As a result, the degree of interoperability could be significantly upgraded, with a number of modifications which can easily and quickly be performed in the field.

1.1
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In two cases, though, communications upgrades to the RSAF AWACS could not be performed in the field and would require major depot-level retrofitting:

1.1
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A related issue concerns the means by which the U.S. could share or monitor the defense information received by the RSAF AWACS in peacetime, when there is no U.S. AWACS deployment to Saudi Arabia. The most obvious approach would be to have U.S. military personnel on board the RSAF AWACS during all flight operations. The U.S. personnel would have to have full authority to monitor all consoles in the RSAF AWACS, since any single AWACS console can be programmed not to depict specific data or track information.

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If a U.S. presence on board RSAF AWACS is politically unacceptable to the Saudis, U.S. military personnel could monitor AWACS data from the ground via any one or combination of three approaches: (1) a TADIL A downlink Ground Entry Station (GES) exclusively manned and operated by the U.S.; (2) U.S. observers or liaison officers present in RSAF Sector Control Centers (SCCs); or (3) a Message Processing Center (MPC) exclusively manned and operated by the U.S. that receives AWACS data "second hand," via TADIL B data links from the RSAF SCCs.

(a) U.S. Ground Entry Station

The main limitation of this approach is that the GES could only receive the AWACS TADIL A downlink when the RSAF AWACS was within operational HF radio range of the ground site (normally about 200 miles). If the RSAF AWACS was operating further away, it would be out of TADIL A range of the U.S. ground station.

A second problem is that the RSAF AWACS communications operator could "filter" the information being downlinked to the U.S. GES. By correlating other data displays in the GES, the U.S. operators could determine that information was being filtered, but they would not know the nature of the information being denied them.

(b) U.S. Presence in RSAF SCCs

By placing an observer or liaison officer in each of the five RSAF SCCs, the U.S. could monitor the AWACS data displayed to the RSAF air defense sector commanders, via the co-located RSAF GESs. Whenever an RSAF AWACS was operating in that sector, the U.S. personnel in the RSAF SCC would see whatever data was downlinked by the AWACS. In this case, though, on board AWACS filtering could restrict complete U.S. data sharing.

(c) U.S. MPC Linked with RSAF SCCs

The U.S. Air Force currently mans and operates a MPC at Riyadh which receives AWACS downlinks via TADIL A and relays that information in a different format to the Dhahran SCC via TADIL B. Conceivably, the U.S. could continue to maintain its MPC at Riyadh and connect it via TADIL B links with the five planned RSAF SCCs. In this way, the U.S. would only need to be present at one site in Saudi Arabia (a site manned exclusively by U.S. personnel), and data received from the RSAF SCCs could be relayed on by the U.S. MPC via TADIL B to other components in a regional data exchange network, including U.S. Navy ships in the Persian Gulf. The major liability, though, is that data from the RSAF SCCs to the MPC could be arbitrarily filtered or cut off altogether, for example, under the guise of an equipment "outage."

Details concerning U.S./Saudi understandings on joint sharing of defense information of mutual interest have not been made known to staff as of this writing, although the staff received some indication that the two countries are considering the establishment of a U.S.-manned and operated AWACS downlink station at USMTM in Riyadh. No further details are known.

(2) Saudi Data Sharing with Other Arab States

The technical means by which a Saudi AWACS could, in peace or war, transmit or share defense information with other Arab states has been discussed in the section of this report dealing with the military impact of the sale on Israeli security. Details of the U.S./Saudi understanding to preclude such a use of the AWACS have not been made known to staff by the Administration, and hence cannot be assessed in this report.

F. Third Country Transfers and Training

The Administration's package of assurances regarding the AWACS sale includes restrictions on third country transfers and training. Under the Arms Export Control Act, transfer of equipment to third countries or training of third country nationals on American-provided equipment is prohibited without U.S. approval.

Some additional assurances and procedures are being worked out for the AWACS package but State Department officials say the details will not be disclosed until Congressional hearings are held on the proposed sale.

There have been questions raised about reports from time to time that the Saudis had shipped American equipment to others or engaged in training operations with American equipment.

The Israelis recently have charged that the Saudis have shipped about 100 tons of light arms to the PLO in Lebanon. American officials said after looking into the matter that as far as could be determined, the equipment was not American.

Several years ago, U.S. officials investigated Israeli reports that some U.S.-manufactured hand grenades and other explosives sold to the Saudis had been used by the PLO. U.S. officials said the material apparently had been taken from Saudi units when they were stationed in Lebanon as part of the Arab peace-keeping force.

In one technical violation reported to Congress, the State Department wrote the Committee in June that the Saudis had transferred to the Sudan about $9 million worth of old M-41 and M-47 tanks, machineguns, rifles, and other equipment. It was transferred before the Saudis received formal U.S. government approval,

the State Department said. In the letter, the Department said the Saudis had been under the impression that prior discussions about "our mutual support for the Sudan" had constituted official approval for the transfer. Subsequently, U.S. and Saudi officials reviewed the procedural and substantive requirements for third party transfers. "The Saudi government has assured us that the transfers here in question proceeded from a genuine misunderstanding and that steps would be taken to prevent a recurrence."

The large numbers of Sidewinder missiles and maverick and other "smart bombs" sold to Saudi Arabia in past years have raised some concerns about the possibility of the equipment being transferred to other Arab countries during a war. U.S. officials in Saudi Arabia say they are confident they could detect any significant shipment of equipment.

They also say, however, that if the Saudis decide to let non-Saudi airmen or ground crews wear Saudi uniforms and train on Saudi equipment, there is no sure way the American military men or contractors could detect them. It could be possible, they say, that Syrian or Jordanian airmen could train in Saudi AWACS and fighter planes to gain experience. The Jordanians and Saudis both have one major type of aircraft in common, the F-5.

G. Personnel and Maintenance Requirements

Saudi Arabia's largest economic development problem is manpower. It is estimated that of the current working force of about 2.5 million people in Saudi Arabia, more than half are non-Saudis. Saudi literacy rates are low (20-30%) and those inclined to study generally prefer liberal arts to technical schools. In 1978, for example, only 38% of the 17,000 places available for technical training in Saudi Arabia were filled.

The Saudi military has adapted to the manpower problems faced by its society. Unlike the Shah's Iran, expansion of the Saudi military has been slowly paced with great emphasis given to building an infrastructure before introducing new hardware. Only about 20% of Saudi Arabia's defense expenditures are for weapons, while the balance is reserved for construction, training, and military pay. Saudi military personnel are treated extremely well with high pay and many fringe benefits. During the 1970's, members of the Hejazi tribes were for the first time allowed to enter the service providing a new manpower pool. Sophisticated training programs were established such as the Technical Studies Institute in Dhahran which now teaches up to 1800 Saudis basic skills such as English, physics, and math.

To judge Saudi progress on specific military projects, we discussed training problems with representatives from Northrup and Lockheed. Project managers of the Northrup Peace Hawk (F-5) program estimate that the Saudis are now 67% selfsufficient and ahead of schedule. By 1983, the Saudis will be completely self-sufficient in maintenance of the aircraft.

There are currently 1634 Saudi trainees in the Peace Hawk program, and only about 1350 are needed. This will be one important source for maintenance manpower for a Saudi AWACS. By contrast, Lockheed ground-based radar programs are only 40% Saudi self-sufficient while the British Lightning Program is also heavily dependent upon foreign personnel.

Absorbing AWACS and the KC-707 tanker will strain Royal Saudi Air Force (RSAF) manpower during the period 1985-1987. Table 1 below shows the Saudi Air Force manpower problem for the decade of the 1980s. AWACS and other new RSAF programs create a requirement for about 2570 well-trained Saudi personnel during the decade. Under these projections the Saudis would give top priority to filling the AWACS aircrew with Saudi personnel. Even this, however, will create problems.

It is estimated that at least 170 additional trained Saudi personnel will be needed as pilots and radar surveillance operators for the five AWACS. Currently only 120 Saudi Air Force military personnel are capable of performing radar weapons control and early warning surveillance functions. An adequate number of pilots will be available, but the number of RSAF personnel for radar operations functions will have to double in the next four years. Since the AWACS program is of high priority to the Saudis, the AWACS personnel schedules are likely to be met, but probably at the expense of other programs.

Saudi Manpower Requirements

	1982-1984	1985-1987	1989 1990
AWACS Requirement	0	525	70
Other Requirements*	1060	775	70
Cumulative Requirements	1060	2360	2500
Total Projected Available Manpower	920	1780	2570
Total Projected Saudi Shortfall	(-)140	(-)580	(+)70

*Includes F-15s, new helicopters, C3, and tankers.

Because of these shortfalls and the high skill levels required to maintain AWACS, an estimated 480 American contractors and 25 USAF personnel will be needed for the Saudi AWACS program in 1985. In addition, 270 American contractors will be needed for the KC-707 program. These contractors, plus the 35,000 line items of spare parts normally required to maintain AWACS, should provide the United States with leverage over the use of AWACS. It is also expected that Saudi AWACS will require periodic depot-level maintenance at Tinker Air Force Base. If U.S. contractors are withdrawn and spare parts are stopped, U.S. officials estimate that five Saudi AWACS could sustain a 24-hour orbit for less than a week.

The AWACS and KC-707 contractor support program will exacerbate a situation which may some day create problems for the United States. There are now about 45,000 Americans in Saudi Arabia, which compared to the Saudi population, is seven times the ratio of Americans to Iranians in the Shah's Iran. These including about 1500 U.S. government personnel working on security assistance programs and about 3000 U.S. defense contractor personnel. There are already more U.S. military personnel and contractors in Saudi Arabia for military training purposes than in the rest of the world combined. By 1985, another 1000 American military contractor personnel will be in Saudi Arabia. (See Chart 1)

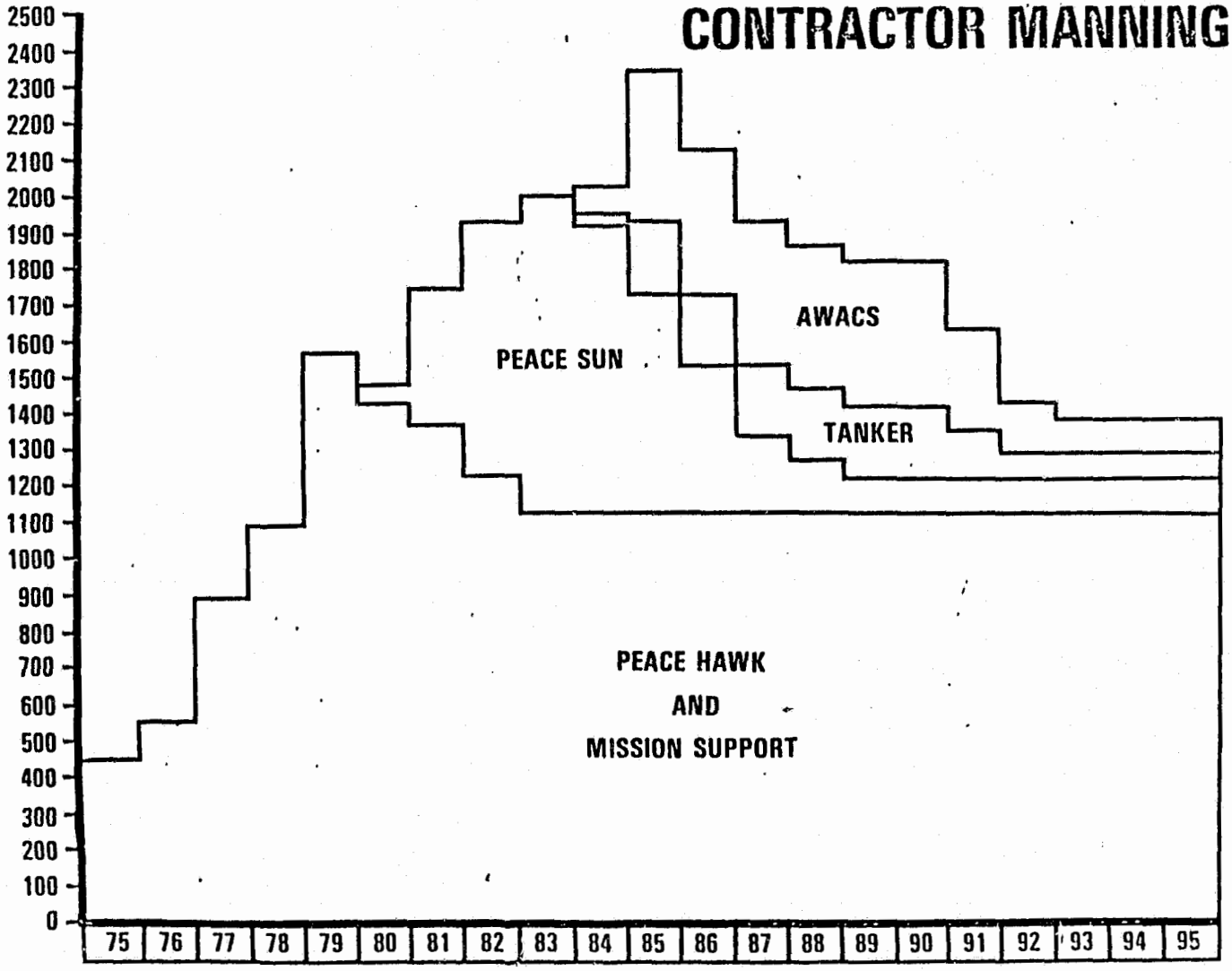
There are at least two potential problems with a large, visible U.S. military assistance presence in Saudi Arabia. The first is that they may be rejected by the host government as President Sadat rejected the Soviets in 1973 because they became too powerful. The second is that U.S. personnel could become engaged in combat activities and thus involve the United States more deeply in a regional conflict than it might otherwise be. Both are risks that the Administration appears willing to take. The risks involved can be reduced if U.S. personnel in Saudi Arabia maintain a low political profile and if rules of engagement are clearly spelled out for U.S. military and contractor personnel.

H. Arms Control Implications

The Executive Branch is expected to argue that the proposed sale of AWACS/F-15 enhancement equipment to Saudi Arabia can be stabilizing. Essential justification for this point of view is that the Saudi forces are defensive in nature, that Saudi Arabia could not reasonably have designs upon its neighbors, and that those threatening Saudi Arabia are better equipped and have larger forces. Accordingly, enhancing Saudi Arabia's defenses, particularly its ability to defend the oil fields, will reduce the threat of conflict and help deter those who contemplate attacking Saudi Arabia.

On the other hand, it is clear that the Israelis view the proposed sale as dangerous to their national security interests. If the sale were to lead to higher levels of Israeli armaments, the net result would have been a furthering of the arms race that has plagued the Middle East for so many years. Further military enhancement of Israel might spur Syria to seek additional help from the Soviet Union and it could increase the desire of the Iraqi government to

CHART 1



SOURCE: DEPARTMENT OF DEFENSE

compensate for these additional weapons in the hands of potential adversaries. This desire would, of course, be increased as a result of the losses Iraq has suffered in the spasmodic war with Iran.

Egypt could well be another candidate for increased armaments as neighboring nations continued their build-up. Egypt has already shown interest in purchasing the E-2C. The result would be increased pressure upon the U.S. and the Soviet Union to funnel more weapons into the Middle East. The effect of the sale would be tempered by the fact that it does not involve a net increase in the numbers of combat aircraft in the Middle East.

Disapproval of the sale would not necessarily alleviate Israel's concerns about a new round of arms buying or the introduction into the region of sophisticated new technology, since both of these issues would also be raised in the context of a Saudi decision to purchase the Nimrod. In some respects (for example, its frequency agile radar and passive electronics-gathering equipment), Nimrod might be perceived by Israel as more threatening than AWACS and hence demanding a more extensive Israeli response.

I. Impact on U.S. Force Readiness

With the exception of the AIM-9L, all components of the AWACS/F-15 enhancement package would come from new production and entail no draw-down or diversion of U.S. systems. The 5 AWACS aircraft purchased by Saudi Arabia would utilize a standard Boeing 707-320B airframe, with planned following of the 34 U.S. and 18 NATO AWACS airframes. Equipping the airframes with the Saudi-configured mission hardware would not begin until after completion of the U.S. program and would not affect the NATO program, since the NATO AWACS mission equipment installation and checkout phase is being performed under a NATO contract in West Germany.

The eight Saudi KC-707 tankers (six ordered with an option for two more) would also utilize new production Boeing 707-320B airframes. However, the construction of 5 AWACS and 8 tankers over a two year period would be well within Boeing's production capacity of eighteen 707-320B airframes per year.

The USAF does not employ conformal fuel tanks on its F-15 fighters. The 101 unit sets slated for Saudi Arabia would be produced by McDonnell Douglas using a dedicated assembly line. Should the USAF subsequently elect to procure CFTs for its F-15 fleet, McDonnell

Douglas's production rate could be increased to permit concurrent procurement.

In the case of the AIM-9L sale, the U.S. plan calls for the delivery of the missiles from current U.S. inventories on a one-for-one basis as new AIM-9L missiles are received from the manufacturer, Raytheon Corporation. Raytheon no longer produces AIM-9Ls, having converted its assembly line to the production of the more advanced AIM-9M. Since the U.S. would be retiring its AIM-9L missiles in favor of the AIM-9M anyway, the Saudi AIM-9L sale would in effect subsidize the cost to the U.S. of upgrading a significant portion of its short range air-to-air missile inventory. The AIM-9M has a more advanced optic seeker, capable of distinguishing the target from flare decoys, and a cleaner burning propellant, which makes it more difficult for an enemy to detect the missile in flight.

While the Saudi AWACS/F-15 enhancement package entails no adverse impact on U.S. force readiness in terms of the hardware provided, it could have a negative effect on U.S. Air Force retention rates for skilled AWACS radar maintenance, computer support and systems operator personnel. At present, only one organization in the Air Force, the 552nd AEW&C Wing, operates the AWACS. The 552nd is also tasked with training NATO personnel in AWACS operations and maintenance. Due in part to the long and frequent temporary deployments performed by this Wing (currently averaging over 150 days per year out of country), the unit is already having a difficult time in retaining trained personnel when their service commitments expire. For example, the unit should be manned with 379 supervisor-level (O-3 through O-5) weapons control officers, but only 288 are presently available. By 1985, the unit will need 900 such officers to operate the entire 34 AWACS force.

Furthermore, given Saudi manpower shortages, Saudi Arabia will depend heavily on U.S. contractor support in training systems operators. Assuming Boeing were to receive the training contract and were to offer lucrative contracts to those signing up for the Saudi AWACS training and maintenance program, the already inadequate manning levels for trained personnel in the 552nd could be further lowered. Boeing has pledged not to engage in active recruiting of 552nd personnel, but word-of-mouth communication will quickly make known what job opportunities and salary levels are being offered.

Nevertheless, the problem of retaining skilled technicians in the U.S. military is clearly not a function of whether one particular foreign military sale is or is not made. An individual's decision to leave the military is influenced by myriad only one of which is the salary which could be earned in the civilian sector. And, irrespective of the Saudi AWACS case, a highly qualified radar maintenance serviceman or computer systems operator can likely find gainful employment in industry if he or she chooses. It should also be pointed out that the Air Force's experience to date with the Saudi F-15 program does not reveal a significant exodus of active duty personnel into the contractors' ranks, as only 5% of the contract personnel have prior F-15 experience. This could change, of course, once delivery of the F-15s begins next year and contract manning levels rise.

VI. APPENDIX: TECHNICAL DETAILS OF THE PACKAGE

A. E-3A AWACS and Related Ground Radar Environment

The E-3A is a modified Boeing 707-320B aircraft with added surveillance radar, computer and communications equipment. It provides an overall air surveillance capability with command, control, and communication functions, and can detect and track aircraft at high and low altitude, over both land water. The E-3A airborne warning and control system provides real time and long-range target detection, identification, and tracking.

The E-3A normally operates at an altitude of 29,000 feet and a cruise speed of 0.72 MACH. The AWACS can fly up to 40,000' altitude, but its radar elevation angle is optimized for operations at 29,000 feet. It can fly for approximately 11 hours without inflight refueling, and up to 22 hours with refuelings and an augmented crew. The normal crew of 17 consists of 4 flight crew members and 13 mission crewmembers. This crew can be augmented as necessary.

The mission crew has 8 multipurpose consoles which can be used for surveillance, and control of the air defense situation. Three HF, fourteen UHF, and four VHF radios provide voice and data link capability. However, the AWACS does not possess any special capability for gathering electronic or signal intelligence.

The most prominent feature of the E-3A is the large rotating radome that houses radar antennas, including a "look down" pulse doppler radar interleaved with an F Band pulse mode radar and a maritime surveillance mode.

Radar detection range for low-flying (200 feet altitude) small fighter aircraft is 175NM from normal AWACS mission altitude (29,000 ft.). Medium-size targets can be seen at 240NM if they are above the radar horizon. Detection range for high-altitude bomber-size target aircraft is 360NM. Ground targets (tanks, trucks) cannot be detected or tracked. Only airborne targets moving at speeds greater than 80 knots are seen. Small maritime targets can be detected and tracked in low-moderate seas; medium-large maritime targets can be detected and tracked in moderate-high seas.

Configuration of the RSAF AWACS will be identical to the standard USAF E-3A aircraft except that the Joint Tactical Information Distribution System (JTIDS), Electronic Counter Counter Measures (ECCM) enhancement

and sensitive intelligence information, HAVE QUICK UHF communication modifications, and three additional display consoles included in the latest USAF version will not be included nor will commercial substitutes be provided for these systems. However, less advanced, "sanitized" substitutes will be provided for the U.S. Government Mode IV Identification Friend or Foe (IFF) and U.S. Government encryption systems.

Availability:

(1) The E-3A aircraft will be available through FMS beginning 48 months after approval.

(2) Aircraft cost is estimated to be $1.7 billion including spares, tech data, support equipment, training.

(3) Other Purchasers: NATO.

Anticipated Deployment Location: Riyadh for approximately one year and then Al Kharj.

Quantity Required: RSAF has requested five E-3A aircraft.

Estimated Additional Manpower Requirements:

a. Aircrew - 170, two cockpit and mission crews for each aircraft.

b. Five E-3A aircraft require approximately 360 maintenance personnel. This would allow Saudi Arabia to maintain one 24-hour AWACS orbit for one week during periods of high tension.

Estimated total AWACS Program Cost: $4.3 billion.

Saudi Arabia also plans to upgrade the existing ground environment portion of its air defense system, which was acquired in the late 1960s. The ground environment improvements package, encompassing modernization of the Royal Saudi Air Force (RSAF) Command, Control and Communication (C3) system is included in the full RSAF enhancement package sent to Congress.

The planned improvements in the Saudi ground environment system are based on a two-year C3 master plan study conducted by the US Air Force for the RSAF.

The planned upgrade includes new hardened command and control (C2) facilities; new data processing and display equipment for those facilities; and improvements to the ground radar surveillance network

through replacement of existing radars, and addition of new sites to extend coverage.

The AWACS would significantly augment ground environment surveillance capability and provide C2 flexibility through its interface with the ground environment by means of ten Ground Entry Stations. These Ground Entry Stations, located at C2 facilities and other selected locations for optimum radio coverage, provide communications and processing equipment for data exchange compatibility between AWACS and ground environment data processing systems.

The ground environment improvements will take about six years to complete. The total cost of this program to the Saudis is estimated to be $1.5 billion. The Saudis plan for the 22 radars to be jointly acquired and operated by the RSAF (10 systems) and the Presidency for Civil Aviation (12 systems).

Total cost of AWACS and ground radar environment programs: $5.8 billion

B. KC-707 Tankers

The KC-707 is an aerial tanker version of the Boeing 707-320B transport. The KC-707 would provide in-flight refueling for Saudi F-5 and F-15 aircraft, with both boom and probe and drogue refueling capabilities. The KC-707 would be produced on the same production line as the E-3A AWACS and share airframe, engines, and maximum commonality of aircraft systems.

Availability: KC-707 aircraft could be available through FMS beginning in 40-44 months, at a rate of approximately one aircraft per month. Total program would include:

(1) Eight new production KC-707 aircraft;

(2) Three years of initial spare parts;

(3) Common and peculiar support equipment;

(4) Training in the United States.

(5) Three years of contractor aircraft maintenance and aircrew and maintenance training. Approximately 320 contractor personnel will be required to provide initial in-country support. Follow-on contractor support is expected to be needed for an extended period but will decrease as RSAF personnel assume maintenance responsibilities.

Anticipated deployment location: Initially at Riyadh (approximately one year) with later move to Al Kharj which will be the permanent main operating base.

Quantity required: Saudi Arabia has requested six KC-707s with an option to buy two additional aircraft.

Additional manpower and training requirements: Aircrew: 96, two crews for each of eight aircraft. Personnel can be converted from C-130 program plus new pilot training assets.

Estimated program cost: $2.4 billion.

C. AIM-9L Missile

The AIM-9L represents the third generation in the Sidewinder family of short range, air-to-air infrared (heat-seeking)missiles. It incorporates an "all aspect" guidance and control system which allows head-on attack. The major improvements of the AIM-9L over the AIM-9P-3, currently possessed by the Saudis, include: improved seeker, providing all-aspect and better look-down/shoot-down capabilities; increased maneuverability; and improved warhead lethality.

Approximately 4000 AIM-9Ls are currently in USAF and USN inventories. The AIM-9Ls proposed for sale will come from U.S. inventories on a one-for-one basis as the more advanced AIM-9M series is procured.

Estimated Unit Cost: $98,000 (does not include spares, support, training, etc.).

Other Purchasers: Israel, UK, Germany, Norway, Italy, Japan, Australia, and Greece.

Anticipated Deployment Locations: Dhahran, Taif, and Khamis Mushayt.

Quantity Required: 1,177.

Estimated Additional Manpower Requirements: nine (9) contractor personnel based on increased stockpile requirements.

Estimated Additional Training Requirements: Minimal aircrew and ground handling/load crew training procedural changes from AIM-9P-3.

Estimated Program Cost: $200 million.

D. Conformal Fuel Tanks (CFTs)

CFTs, also known as "Fast Packs," are streamlined fuel tanks attached to the sides of the F-15 fuselage, with an empty weight of abut 2,000 pounds and a total fuel capacity of approximately 9,750 pounds per set (1500 gallons). With normal weapons loadings, the CFTs extend the combat radius and loiter time of the F-15 by 70-80%.

The CFTs attach to the aircraft in a manner that enables rapid installation and removal (about 90 minutes are required to install and check out CFTs). Once attached, the tanks cannot be jettisoned in flight.

The CFTs retain the capability to mount and fire four AIM-7 SPARROW air-to-air missiles, which have already been approved for sale to Saudi Arabia. In addition, the CFTs have been designed with an optional capability to carry air-to-surface munition. However, changes to the Saudi F-15s would be required to allow the CFT to carry air-to-surface munitions. The Saudis could not perform these modifications without U.S. approval and assistance. Nevertheless, the Saudi F-15s could carry bombs on existing wing-mounted hard points.

Availability: USAF production contract is expected to be awarded in January 1982 for initial quantity of 75 ship sets pending Congressional approval. The USAF plans to fund additional CFTs in FY 83-87.

(1) US First Delivery Date: June 1983.

(2) Production Availability: 27 months after contract award.

(3) Commercial Availability: Yes.

(4) Estimated Unit Cost: $900K (does not include spares, support equipment, tech data, training).

(5) Other Purchasers: Israel.

Anticipated Deployment Locations: RSAF F-15 Operation Locations: Dhahran, Taif, and Khamis Mushayt.

Quantity Required: 101 ship sets.

Additional Manpower and Training Requirements: None.

Estimated Program Cost: $110 million.